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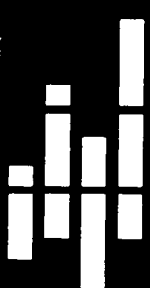
ABSTRACT

This document reports on how key stakeholders in work force preparedness nationwide are responding to pressures of the skills race. Part 1 presents an overview of the skills challenge and the economic and social consequences of failing to meet the challenge. Part 2 examines the impact of the skills shortage on major stakeholders and explains how the build-up of pressure has pushed U.S. employers, workers, educators, trainers, community leaders, and government officials to join forces to strengthen the transition from school to work, pool their resources to improve training quality and reduce training costs, and respond to market demand for greater access to training and greater portability of skills. Part 3 details some of the more creative developments in work force development and distills eight winning principles for success in the field. An agenda for change is proposed that includes the following items: (1) build public awareness; (2) fill information gaps; (3) leverage technology; (4) focus on metrics (measurement of results); (5) tighten accountability; (6) share best practices; and (7) encourage personal initiative. Lists of the task force members, executive committee members, national affiliates, and 11 related publications conclude the document. (Contains fifteen figures and 55 section endnotes.) (MN)

WINNING THE SKILLS RACE



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WINNING THE SKILLS RACE

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CONTENTS

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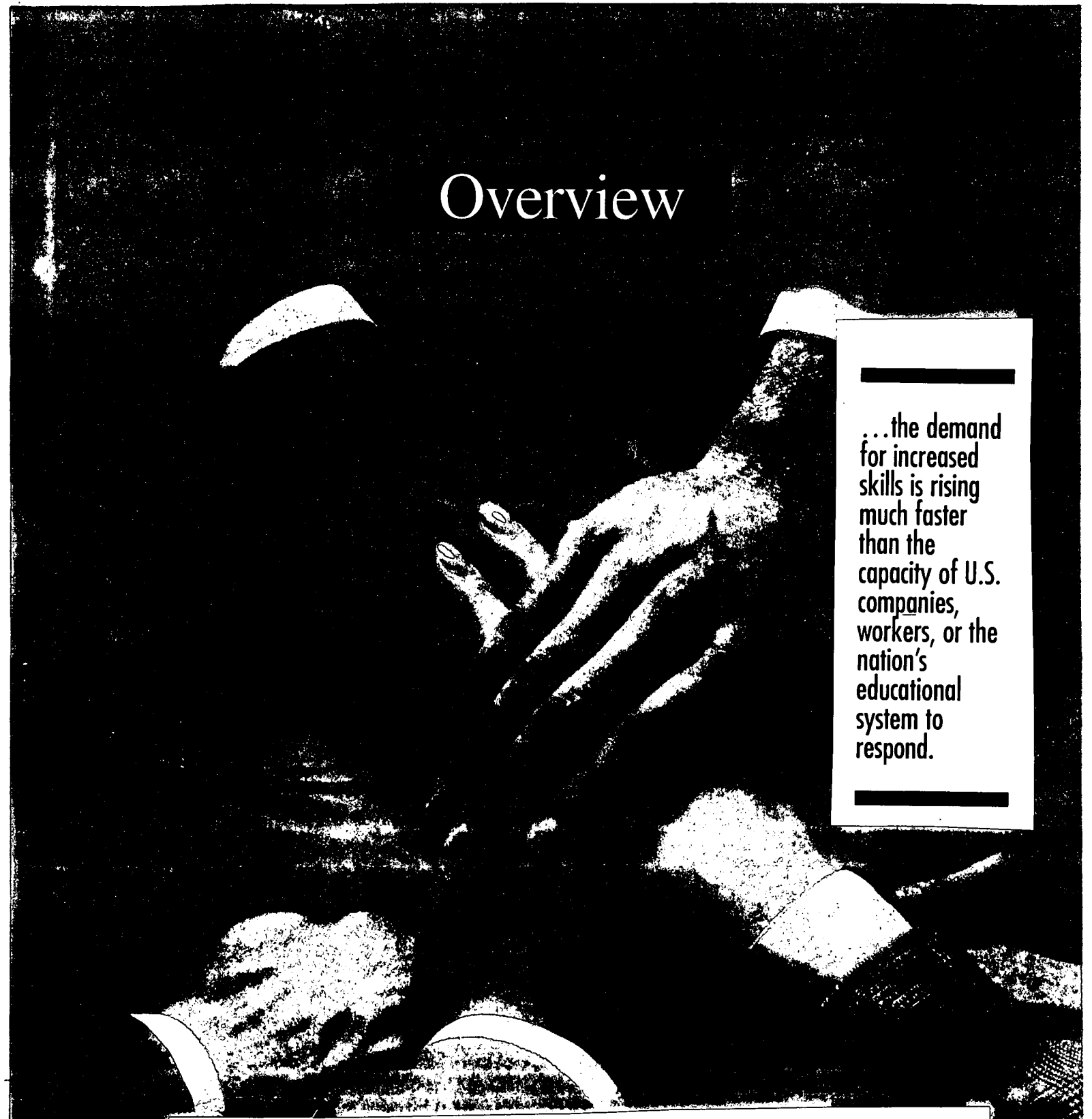
The Council on Competitiveness would like to thank all of the individuals and organizations that helped develop this report. The ability to recognize team efforts in the field demanded a team effort at the Council.

Special thanks go to our fine Workforce Task Force for providing feedback, information, and general guidance throughout the process and to the three chairmen — Richard Notebaert, George Becker, and Hal Raveché — for their commitment to these issues. Marvin Bailey of Ameritech was a tremendous resource who devoted significant amounts of his time to reviewing drafts and offering advice.

Council Senior Fellow Amy Kaslow took charge of the project, providing strategic oversight and direction throughout the two-year effort. She and former Council Associate Gretchen Rhines conducted all of the site visits and many other interviews that shaped the final analysis. Ms. Rhines served as a superb day-to-day manager of the project, coordinating visits, researching issues, and refining the end product. Former Senior Fellow Howard Samuel provided essential counsel throughout.

The Council wishes to acknowledge the Dr. Scholl Foundation, Council members, and other corporate sponsors of this initiative. Finally, we would like to recognize all the people we interviewed in the field who generously shared their stories, perspectives, and insights with us. Their compelling examples and anecdotes give this report its unique flavor.

Overview



...the demand for increased skills is rising much faster than the capacity of U.S. companies, workers, or the nation's educational system to respond.

WINNING THE SKILLS RACE

WINNING THE SKILLS RACE

U.S. prosperity in today's knowledge-driven economy demands the world's most skilled and productive workforce. Members of the Council on Competitiveness have singled out worker skills as the greatest competitive challenge the nation faces over the next decade. Their concern reflects broad recognition among leaders from business, labor, and universities that we face compelling pressures to upgrade the U.S. skills base:

- Information technology has become a defining feature of the American workplace, turning computer literacy into a basic skill requirement and creating a demand for knowledge workers that is not being met.
- Global competition has intensified, increasing the economic premium on high skills and leaving unskilled American workers in an increasingly vulnerable position.
- The aging of the national workforce has produced a massive requirement to replace a generation of skilled wage earners that will reach retirement age by 2005.
- Welfare reform has mandated a move of several million mostly unskilled Americans from public assistance into entry-level jobs over the next five years.

This Council report on upgrading worker capabilities provides fresh insights from across the country on how key stakeholders in workforce preparedness – employers, workers, educators, trainers, and government officials – are responding to the pressure of the skills race. Under the guidance of a Task Force made up of widely respected experts and practitioners, the Council combined focus groups in Washington with more than a year of site visits in the field to companies, labor unions, educational institutions, and non-profit organizations.

Our research and writing team traveled to every region of the country to search for examples of best practice in community workforce development. They spent hours on the ground with workers, union representatives, trainers, managers, and senior executives in companies large and small. They visited community colleges, private training vendors, and non-profit workforce alliances. They also met with municipal, state, and federal officials with hands-on responsibility for publicly funded training programs. This distinctive approach has put a human face on a challenge that is national in scope, urgent in character, and too often viewed as an abstraction.

...members of the Council on Competitiveness singled out worker skills as the greatest competitive challenge the nation faces over the next decade.

Overview

Employers in all industries are scrambling for workers who can adapt quickly to new tasks and new market demands.

The Council's firsthand look at efforts to meet the skills challenge validates a simple but fundamental point: the demand for increased skills is rising much faster than the capacity of U.S. companies, workers, or the nation's educational system to respond. Distressing numbers of workers cannot read or do simple math, while the need to upgrade the skills of incumbent workers is outstripping the capacity of virtually all companies. Employers in all industries are scrambling for workers who can adapt quickly to new tasks and new market demands. Workers recognize the link between higher skills and higher wages, but many feel deeply insecure about the pace of change in job requirements. Few can count on spending their careers at one company, and many are struggling to make themselves employable. Community colleges and four-year schools face rising expectations to shorten and sharpen the learning cycle, along with growing demands to provide remedial education. Governments at every level face comparable pressure to streamline public sector training programs and to adapt them to local needs.

Part I of this report provides an overview of the skills challenge. It describes today's crunch as more than the result of tight labor markets — it is structural in origin. If we do not meet the challenge, the economic and social costs will be profound: future growth will be cut; the income gap will widen further; competition for low-skilled jobs will increase; and U.S. companies will look increasingly offshore to meet their high-skill requirements.

Part II examines the impact of the skills shortage on major stakeholders. The build-up of pressure has pushed employers, workers, educators, community leaders, and public officials to cooperate more closely. They have joined forces in areas of shared interest. They are strengthening the transition from school into the workplace, pooling resources to improve the quality and to reduce the costs of training, and responding to market demand for greater access to training and for greater portability of skills. Progress has been uneven, but longstanding walls between employers and schools, schools and workers, and the private and public sectors are gradually breaking down.

Part III looks beyond the trends into the specifics of local solutions to shared problems — approaches that document what works through a rich set of examples from across the country. A number of strategic insights can be distilled from these examples:

- **Collaboration defines best practice in training and education.** No single business, group of workers, educational institution, or government agency can tackle the challenge alone. All parties need to be fully engaged in the design and execution of pace-setting programs: employers provide learning opportunities, workers devote time and energy to learning, and schools teach marketable skills. Collaboration is most likely when employers clearly define their needs, workers have an up-front stake in learning new skills, and providers of training are attuned to market demand.

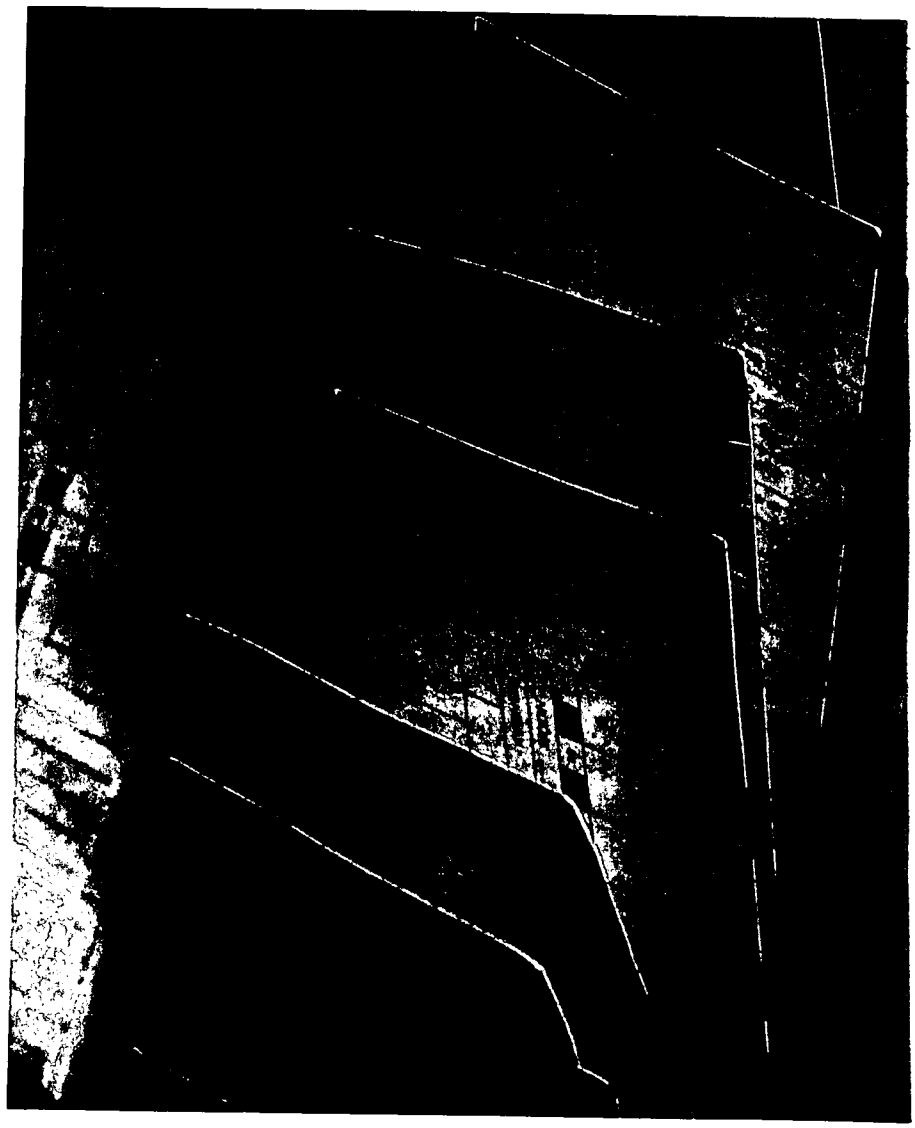
- **Success is most likely when training outcomes are measured and when all parties are held accountable for their performance.** Best practice in community college training, corporate programs, and publicly funded employment and training centers is linked invariably to good metrics and real accountability. These factors produce winning results across the board. Workers gain upward mobility and greater employability; firms gain increased productivity; providers gain revenues; and communities benefit from economic growth.

- **Work-related learning is increasingly job-specific, on-site, and just-in-time.** There is a clear trend away from subject-driven, off-site, classroom-style education and training. Instead, the compression of time puts a greater premium on convenience and customization. Best practice today focuses on providing on-demand training from desktop computers, promoting interactive learning on-site, and shortening the cycle of formal training courses.

- **New learning technologies are transforming education and training by overcoming barriers of time, distance, and availability.** The computer-based and Internet-based tools that are being deployed throughout the United States have vast potential to reduce costs, increase access, and customize the learning process. Best practice allows both employers and workers to tap into resources at their own pace and convenience. But electronic tools are not readily accessible to everyone and are not a cure-all. They must be incorporated into broader strategies of skills development.

- **Outstanding training initiatives anticipate as well as respond to change.** Not all best practice addresses the immediate shortfall in skills. Many notable efforts have been launched to meet over-the-horizon challenges. The imminent retirement of manufacturing workers in the Midwest, the population explosion in the far West, and constantly changing impact of technology on skill requirements are some of the developments that have sparked new approaches. What sets these initiatives apart is their readiness to commit resources now to prepare for future needs.

The Council's inquiry shows collaboration on the rise in every part of the country, especially to bridge the gap between schools and the skill demands of the workplace. Companies, unions, and educational institutions are looking beyond their own immediate needs to exercise leadership in workforce development



at the community level. Strengthening the talent pool has become a centerpiece of state-led and community-led growth strategies.

The direction of change may be positive, but its pace clearly is not fast

Strengthening the talent pool has become a centerpiece of state-led and community-led growth strategies.

enough. Despite their pressing needs and the well-documented payoff of investments in skills, employers' spending on formal training lags behind the growth of the workforce on a per capita basis. The costs and risks of training — both for companies that fear loss of investment through early turnover and for workers who wonder what the return will be — still thwart change. Too many individuals and institutions are unaware of how to partner their way to upgrading skills, or are not ready to make the commitment to do so. The temptation to point the finger at others for the skills shortage — shortsighted employers, unmotivated workers, deficient K–12 education, or poorly executed government programs — remains high.

Americans can unite around an action agenda to win the skills race. The Council's assessment of best practice in the field underscores seven items that belong on this agenda:

1) **Build Public Awareness.** A concerted effort to upgrade worker capabilities requires broad public support. Leaders from every sector of the economy should reinforce the message that the United States has a vital stake in workforce preparedness and that collaboration is the most effective way to meet the challenge.

2) **Fill Information Gaps.** Increased collaboration requires labor market information that is timely, accurate, and easily available. Federal and state agencies can contribute leadership and resources, but most information has to be collected and disseminated at the local level. This is where most workers find out about learning opportunities, small companies pool resources, and corporations share their workforce needs with educators, trainers, supplier firms, and potential hires.

3) **Leverage Technology.** World leadership in information technology should give the United States a clear edge in training and education. Internet-based clearinghouses, for example, expand the flow of information to communities around the country on workforce needs, learning opportunities, and best practice. State-of-the-art resources also act as multipliers, increasing the availability of cost-effective, online learning tools, which particularly benefit small and mid-sized firms, the country's most prolific job creators but the lowest spenders on training.

4) **Focus on Metrics.** Training succeeds when employers, workers, educators and government agencies are able to gauge the impact of investment on outcomes. Today's limited efforts to measure results must be vigorously expanded. Good metrics require determined efforts to track the outcome of training on job placement and job performance, as well as the company's bottom line.

5) **Tighten Accountability.** Improved metrics should make it easier to hold providers of training responsible for their performance. Government agencies can tighten accountability through extensive use of performance-based funding. Companies, in turn, can raise the stakes to ensure that in-house training competes with the best available.

6) **Share Best Practices.** Individuals, organizations, and communities all need more exposure to the experience and success of others. Government has a particular contribution to make in benchmarking and sharing best practice in communitywide workforce development. Companies, unions, and community colleges must take the lead on a peer-to-peer basis to spread the

word on strategies that produce the best results.

7) **Encourage Personal Initiative.** The most effective agents of change in strengthening worker skills are people who reach outside their own organizations to create networks. These initiators ask, "What are my needs? Who shares my concerns? What can I contribute? What resources can I tap?" Every stakeholder in the skills race must find and support a cadre of initiators.

The Council will engage its members and national affiliates over the coming year to move this agenda forward. We will share our findings with public and private sector leaders, gather additional examples of best practice, and publish a profile benchmarking U.S. workforce capabilities. The stakes are high, and the need for greater collaboration has never been more compelling.

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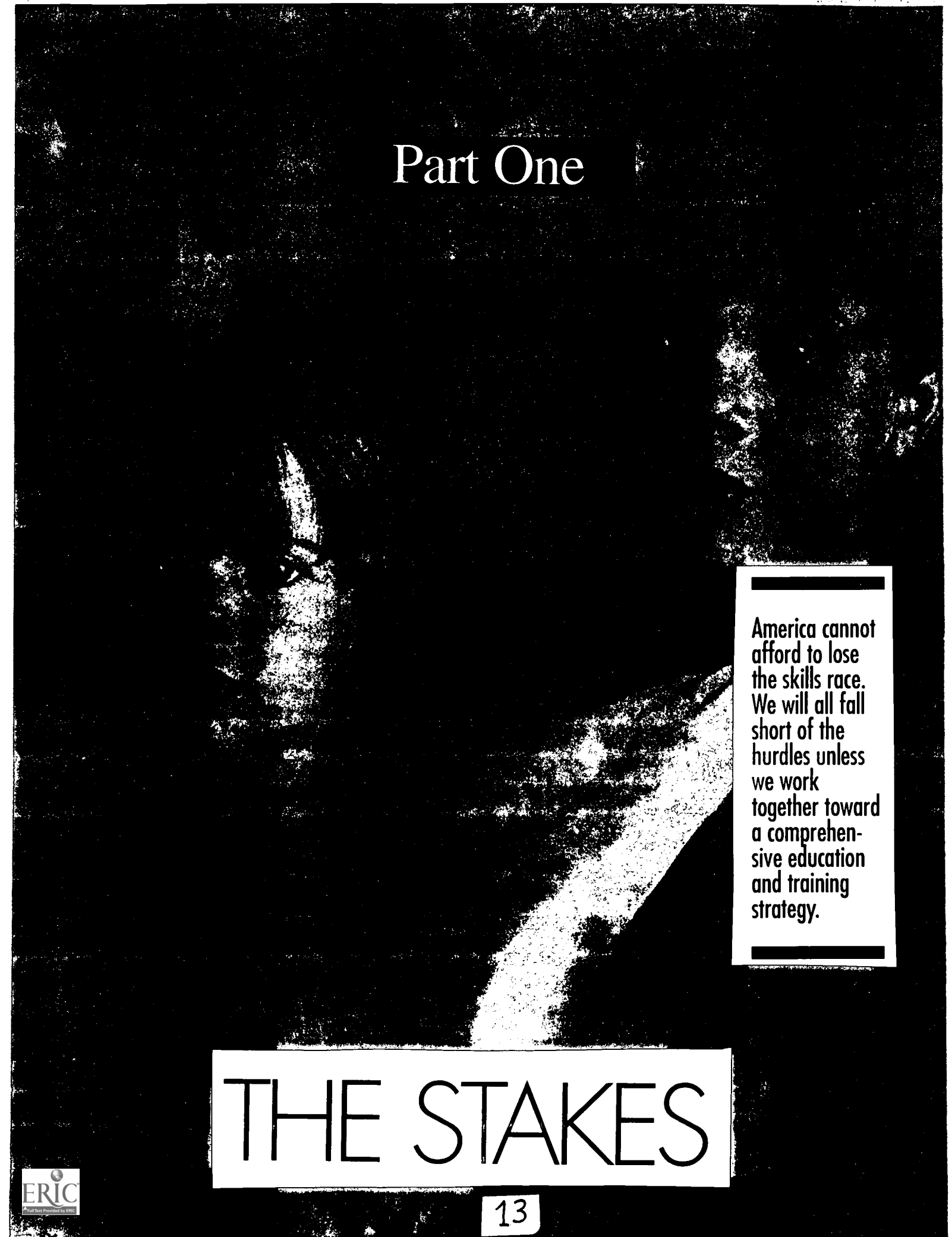


Part One

America cannot afford to lose the skills race. We will all fall short of the hurdles unless we work together toward a comprehensive education and training strategy.

THE STAKES

THE STAKES

Never before has the appearance of working America been so deceiving. With the strong comeback from the relatively high rate of joblessness of the late 1980s and early 1990s, the outlook seems very bright. Record numbers of people are working, and the unemployment rate is the lowest it's been in decades.

But the reality behind the numbers is troubling. There is an acute skills shortage in every part of the country that threatens the foundation of American competitiveness.

Our findings are based on a year of travel across the United States, listening to people in the field talk about their most pressing concerns. Their problems and potential solutions are certainly not limited to any particular place or time. Nor are they restricted to one level of the workforce, or to one specific business. The issues are very real across the spectrum.

- In the Midwest, for example, business is booming, and skilled labor is nowhere to be found. A major employer in Milwaukee, the automation firm **Allen-Bradley**, has been particularly hard-hit. Like many companies across the nation, its workforce is aging; within 10 years an estimated 80 percent of its employees will retire. With an unemployment rate of less than four percent, local labor pools have all dried up. To avoid hemorrhaging, the company is scouring both local and distant schools to find qualified new entrants. The fixation on meeting current labor needs has become management's most absorbing responsibility.

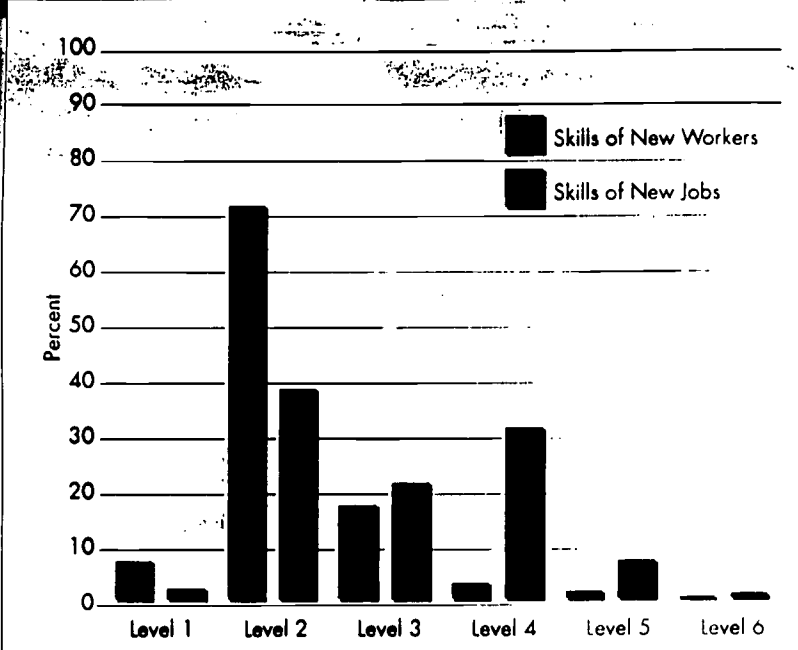
- In parts of the Sun Belt, populations are growing at staggering rates. **US West Communications** is unable to meet service demands in Arizona, Colorado, and Nevada, where many newly built homes have no access to telephone service. With an infrastructure originally designed to meet the needs of a small, rural population, US West cannot keep pace with today's construction rate. The speed of change presents serious training challenges as the company seeks to improve efficiency while simultaneously trying to prosper in a highly competitive industry.

- Nowhere is the bidding war for skilled technicians hotter than in California's Silicon Valley, where some 80 percent of the jobs require specialized learning and basic technical knowledge. What puts those skills at a premium is the constant churning among incumbent workers, who jump to new job opportunities. Hard-pressed companies rely on local educational institutions like **DeAnza College** in Cupertino to continually tailor training programs to transition workers from one job to the next. Whether the courses are conducted on-site at corporate headquarters and plants, offered at the school campus, or available on-line, the learning process is geared toward immediate and practical application in the workplace.

There is an acute skills shortage in every part of the country that threatens the foundation of American competitiveness.

Part One

Figure A
The Job Skills Gap 1985–2000



The bars on the left represent the actual skill levels of new workers (the percent of 21 to 25 year-olds entering the labor market). The bars on the right represent skill levels needed for new jobs (the percent of jobs created).

Level 1: Has reading vocabulary of 2,500 words and reading rates of 95-125 words per minute. Can write simple sentences.
Level 2: Has reading vocabulary of 5,000 words and reading rates of 190-215 words per minute. Can write compound sentences.
Level 3: Can read safety rules and equipment instructions and write simple reports.
Level 4: Can read journals and manuals, and write business letters and reports.
Level 5: Can read scientific and technical journals and financial reports, and write journal articles and speeches.
Level 6: Has same skills as Level 5 but more advanced.

Chart reproduced from "The Demographic and Economic Imperatives," Human Capital and America's Future (Arnold Packer, 1991).

- Service sectors in areas like Orlando, Florida, are scrambling to satisfy massive, short-term hiring needs. Rapid turnover only exacerbates problems for firms like **Walt Disney World Company**, which is hiring thousands of workers, above and beyond its current payroll, to staff its new park and convention center and resort. Around the corner, **Universal Studios** plans to more than triple its workforce (from 6,000 currently to more than 20,000 employees) by 2005. The market is already very tight given the competition for new hires between these two big entertainment companies. But supplier firms and ancillary businesses, growing in response to the big companies' expansion, are competing for much of the same labor. Nearby **Valencia Community College** has turned a potential problem into its own business opportunity by establishing a pipeline of workers through its Hospitality and Tourism Institute. Programs provide on-the-job training to help students move directly into supervisory or mid-management positions in lodging, food service, and tourism.

The skills crunch is not merely the result of tight labor markets. It is deeper and more structural in character. The Schaumburg, Illinois-based **Motorola Corporation** finds only one qualified applicant out of every 10 that it screens for entry-level positions. Even though all of the electronics firm's nationwide applicants have earned high school diplomas, an average of half of them cannot pass seventh-grade math and ninth-grade reading tests.

Motorola is hardly alone. The national job picture shows an American workforce that is not prepared: almost a fifth of employees in the United States have a zero or minimal literacy level in reading and

Source: Fig. A: The Hudson Institute and U.S. Department of Labor.

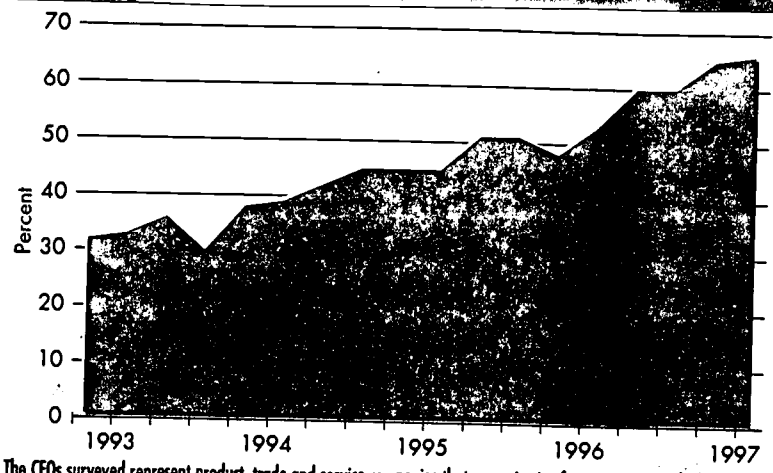
math, two skills essential for workplace success.[1] The outlook is no better for the majority of new graduates, who leave the nation's high schools without a solid foundation in academics. Now, and for the foreseeable future, there is and will be a premium on the ability to read manuals, technical journals, and financial reports and to write business letters, factual reports, and other detailed accounts. Yet almost 80 percent of new workers cannot write even the most rudimentary reports or read the simplest of instructions.[2] *(See Figure A.)*

Corporate America is well aware of the challenges ahead. In 1997, twice as many corporate leaders pointed to the skills shortage as the number one barrier to growth, compared to the number of respondents in 1993. *(See Figures B and C.)*

The limitations are not restricted to the low-end of the workforce. Companies across the board are struggling to find skilled hires. One of the most acute examples is in the information technology industry. Payrolls in U.S. computer and software companies, for example, have practically tripled in the past decade, and their demand for personnel continues to explode. But the dearth of qualified workers can be found in a wide range of businesses outside of information technology.

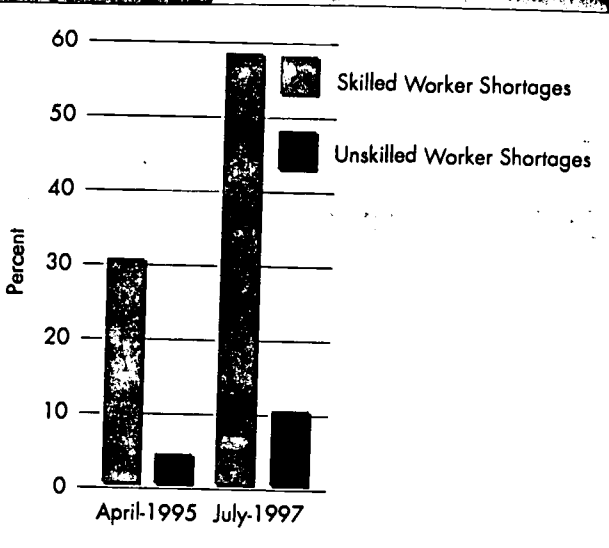
Limited choices have forced many employers to venture overseas for foreign workers with technology skills. Some 144,000 workers in "specialty" categories — primarily skilled technicians — immigrated to this country in fiscal year 1996. According to data from the Immigration and Naturalization Service and the American Electronics Association, they accounted for about half of the nation's overall increase in technology jobs last year.[3] Unless U.S. firms can create "homegrown" technicians, by increasing adult training opportunities and by expanding

Figure B
CEOs Who Say Lack of Skilled Workers Is Number One Barrier to Growth



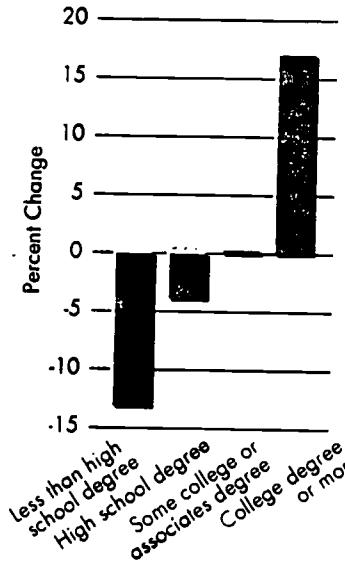
The CEOs surveyed represent product, trade and service companies that range in size from approximately $1 million to $50 million in revenue/sales.

Figure C
Percent of Companies Reporting...



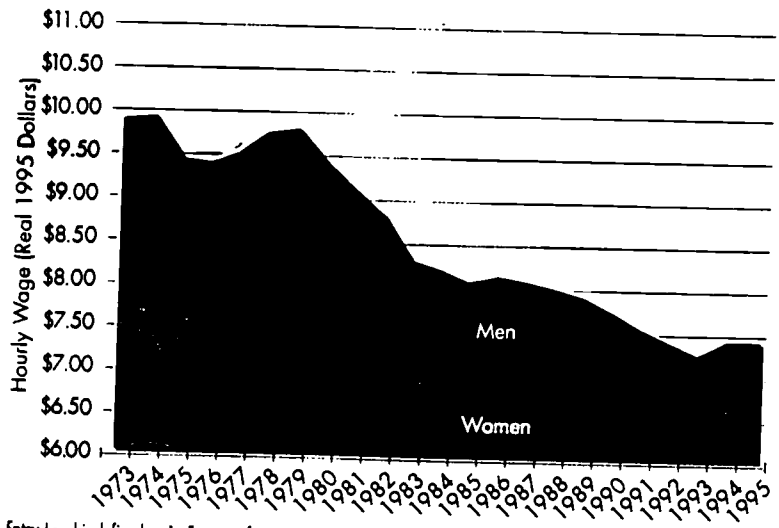
Source: Fig. B: Coopers & Lybrand L.L.P. survey of growth-company chief executives.
Fig. C: National Association of Business Economics.

Figure D
Education Matters More: Growth in Mean Family Income by Educational Attainment of Householder Over the Age of 25, 1979–1996



Income in 1996 CPI-U-XI adjusted dollars.
Note: Data after 1990 are not completely comparable due to changes in the educational attainment questions.

Figure E
Entry-Level Wages for High School Graduates



Entry-Level is defined as 1–5 years of experience.

college graduates in computer and engineering programs, they will move their operations abroad or import talent from overseas.

The shortage of skilled workers exacerbates another troubling trend: wage gaps among American workers. Even though the U.S. economy has expanded at a healthy clip and unemployment has dropped to new lows, the gulf continues to widen between the salaried employee with a relatively higher education and the hourly worker with limited schooling and skills. Only those equipped with at least a college degree have seen their real family incomes increase over the past two decades, while those with less education have suffered income losses.[4] *(See Figure D.)* A major cause of this widening income gap is the long-term slump in job earnings for much of working America.[5] Hardest hit are unskilled workers, whose real hourly wages have eroded the most. *(See Figure E.)*

The skills and income divides are not new.[6] Across the country, there are many, often dueling, perspectives on the major causes of income inequality. Some analysts argue that international commerce is pitting U.S. workers against laborers from low-wage countries. The expansion of global trade, they say, leads to a polarization of wages between the skilled and unskilled. But others point out that most Americans work in industries unaffected by trade, making it difficult to conclude that international competition is the sole determinant of U.S. wages.[7]

Indeed there are a host of contributing factors, including technological change, immigration, the productivity slowdown, weaker unions, deregulation, the growth of the service sector, and the dilution of the minimum wage.[8] Of these, technology is getting much of the attention.

New information technologies skew

Source: Fig. D: Bureau of the Census, March Current Population Survey.
Fig. E: Economic Policy Institute analysis of U.S. Bureau of the Census Current Population Survey data.

the earnings distribution by placing a premium on skilled labor and by reducing the demand for, and wages of, the lesser skilled. This is not only the prevailing viewpoint of private sector economists;[9] the concept has gained momentum among U.S. policymakers. U.S. Deputy Treasury Secretary Lawrence Summers, for example, points to fast-paced technological change and the highly cultivated information society as "far more responsible for changes in the wage structure in this country than is international trade."[10]

Whatever the precise mix of variables may be, one fact is inescapable: skills make or break worker employability and business productivity. And they will take on even greater importance as the United States moves toward a knowledge-driven economy.

What Is Propelling the Race for Skills?

Technological Strides. The advance of information technology over the past 20 years has greatly expanded the demand for skilled workers and diminished the demand for the unskilled. The pace of technological change is powered, in part, by workers who can learn quickly and apply new skills. And even in the best circumstances, technology advancements often push the expectation for higher productivity cycles beyond the capacity of the American workforce because employees are not adequately trained to meet ever increasing demands. Those who fail to absorb new skills are left behind or lose their jobs to foreign competition.

The speed of change has created a new definition of worker responsibility. With hierarchies flattening and accountability pushing down to the ranks, employees are much more involved in many, if not all, aspects of their businesses. It is up to workers to continuously update their skills, and that makes learning a full-time proposition. Life is no longer segmented into hours or years allocated for school and work. Those distinctions are now blurred — schooling continues in the workplace, and beyond.

To accommodate this, schools and corporations are increasingly pressed to shorten and sharpen the learning cycle. Indeed, this development is both part and product of rapid technological change. More and more, the time needed to earn a degree is one year vs. two, two years vs. four. Training sessions are truncated to help individuals move quickly into jobs. No one can afford to wait, now that individual economic security depends on employability instead of job or career stability.

Global Competition. The rapid growth of global competition means that now, more than ever, workers need the education and training to produce value-added goods and services that domestic and overseas consumers want to buy. Government statistics show exports generated roughly one-third of all U.S. economic growth during the past decade, and export-related jobs pay 15 percent more than the average wage. The trend toward export-generated economic growth is obvious, but it can only be ensured with an increasingly skilled workforce.

There is another very compelling reason to boost the skills of American workers. The global economy puts the low-skilled and unskilled at a competitive disadvantage by depressing their pay, at best, or by eliminating job opportunities altogether. American workers are competing against their counterparts in rapidly growing emerging markets where labor is available at a fraction of the cost in the United States The higher the skills, the better the prospects for American competitiveness. Without them, many Americans will spin their wheels, working multiple jobs and logging longer hours, with little mobility or income gains to show for their efforts.

...skills make or break worker employability and business productivity.

Lost Ground to Make Up. Too many people trying to enter the workforce fall far short of the most minimal criteria. While this is not a K–12 study, it is important to repeat a constant refrain heard in interviews and site visits nationwide: secondary schools are failing to turn out enough people ready to work and learn. Education not only boosts productivity in the workplace; it can also help close the gap between the skilled and the unskilled as more workers are able to perform sophisticated jobs.

Global comparisons show how poorly prepared our youth are for the world of work. In the U.S. Department of Education's most recent international study, U.S. eighth graders placed an embarrassing 28th in the world in math and 18th in science.[11] Fewer than half of U.S. high school graduates complete Algebra II or Chemistry, prerequisites for college math and science.[12] Despite the dynamism of the economy, troubling numbers of new entrants are unprepared for work. Several months after commencement exercises, the unemployment rate for 1996 high school graduates was 24.4 percent.[13]

Workforce Changes. The United States has an aging workforce and a youth population that is largely unprepared, creating a polarization that threatens the survival, much less the competitive edge, of U.S. firms. The U.S. Bureau of Labor Statistics (BLS) estimates that by 2005, the number of workers 55–64 years old will jump 50 percent from 1995 levels. Companies are seeing vast portions of their skilled workforce retire, and they are scrambling to fill the void.

In the coming years, new entrants to the workforce will present an even tougher challenge: they are projected to be the least prepared and the most ethnically, racially, and gender diverse in history.

Figure F
Change in Share of Aggregate Income Received by Each Quintile of Families from 1989–1996

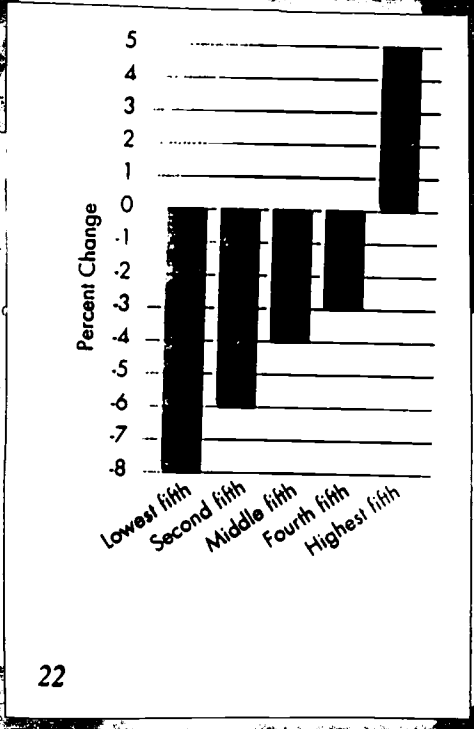


Fig.F: U.S. Census Bureau.

While in the 1950s most immigrants came from European countries, today more than half of the roughly 800,000 legal immigrants who enter the country each year come from seven developing countries: Mexico, the Philippines, Vietnam, the Dominican Republic, mainland China and Taiwan, Korea, and India. The majority of today's immigrants are far less skilled than the majority of U.S. born workers. Male natives are two and a half times as likely to have finished high school as immigrants are.[14] This is a strong signal that basic skills education is critical to placing incoming immigrants in work that is both productive and a means toward self-sufficiency.

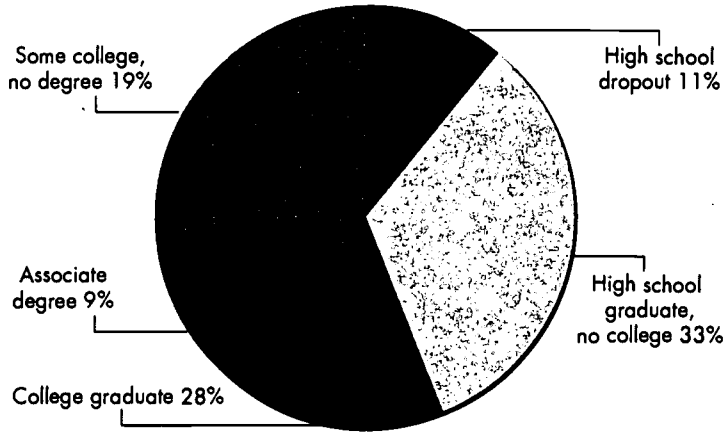
Across the labor pool, the skills shortage is no longer an imbalance. It's an urgency.

A Race We Must Win

The stakes are high for the U.S. economy. More than eight years of record economic expansion have failed to significantly boost incomes among middle Americans, reduce the levels of poverty, or afford low-skilled workers higher living standards. A drop-off in economic growth can only hurt the outlook. If we ignore the skills shortage:

...the income gap will widen further. The vast majority of American families have experienced either modest income growth or an actual erosion in their living standards in recent years, while the small minority of upper-income families had income growth.[15] While families certainly move between income quintiles, it is disturbing that, between 1989 and 1996, the lowest quintile of families saw their incomes decline eight percent, while the top quintile's grew five percent.*(See Figure F.)*

Figure G
Educational Attainment of Civilian Labor Force, 1996 (Age 25 years and older)



...the cycle of poverty will not be broken. The widening of the income distribution contributes directly to child poverty because the sharpest loss in real incomes has been to young people just beginning their working lives.[16] More than a third of all America's poor children belong to families in which at least one parent works all year, but whose earnings can't lift the family above the poverty level.[17] The connection between education and earnings is unmistakable: forty percent of parents in working poor families are high school dropouts. Another 35 percent have no education or specialized training beyond high school.[18]

...U.S. workers with limited education and training will be left behind. Although the economy is improving, the living standards of many working families are not. Over the past 20 years (1975–1995), the earnings of high school dropouts did not even keep up with inflation, and high school graduates barely kept pace. While it is troubling that little more than a fourth of the entire civilian labor force has a college degree, it is striking that this portion of the workforce is the only one that has been able to keep up

Source: Fig G: Bureau of Labor Statistics

with inflation.[19] If these patterns continue, lifetime earnings differences between high and low levels of education will become even more dramatic. *(See Figures G and H.)*

...competition for low-skilled jobs will increase, especially as welfare recipients move off the rolls. The 1996 welfare reform bill has already begun to move waves of chronically unemployed heads of dependent households off of public assistance. A robust economy has helped reduce the number of welfare families by almost one-quarter since January 1995, to a current level below four million. But these people were the easiest to place in the workforce, because they typically have some secondary education and work experience. And there is no guarantee that even a minority of this group will actually stay employed. The biggest obstacle lies ahead as recipients with marginal educations and no work experience are shifted off the rolls. Even under the best conditions, the current glut of low-skilled workers — which has already reached a startling 15 applicants per open position in some Midwestern urban areas — will increase.[20] Without the proper education and training, they will have nowhere else to turn. *(See Figure I.)*

America cannot afford to lose the skills race. We will *all* fall short of the hurdles unless we work together toward a comprehensive education and training strategy. Encouragingly, the key players — business leaders, workers, educators, and government agencies — see that they can best accomplish their common goals as a team. The winning examples cited throughout this report demonstrate that these problems are not insoluble. They are models for what can be championed through collaboration.

Figure H
Lifetime Earnings for Year-Round, Full-Time Male Workers

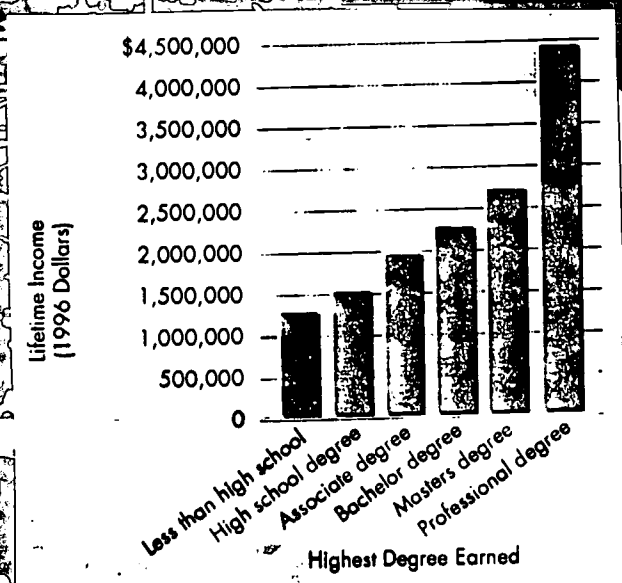
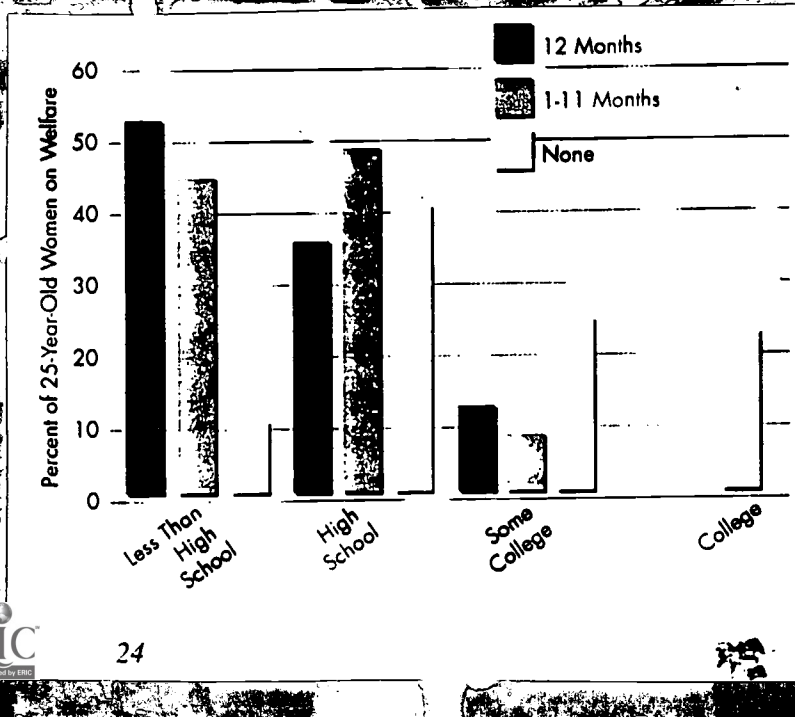


Figure I
Educational Attainment of 25-Year-Old Women, by Length of Time on Welfare



Source: Fig. H: Based on US Census Bureau income data calculated over the years of 18 to 64.
Fig. I: Burtless, Gary. "The Employment Prospects of Welfare Recipients." *The Work Alternative: Welfare Reform and the Realities of the Job Market.* Demetra Nightingale and Robert Haveman, Eds. Washington, DC: Urban Institute Press, 1995.

End Notes:

1 Nickell, S. and Bell, B. "Changes in the Distribution of Wages and Unemployment in OECD Countries." *American Economic Review.* May 1996, pp. 302–308. Uses data from the 1995 OECD Literacy Survey.

2 The Hudson Institute and U.S. Department of Labor.

3 Behr, Peter. "Cultivating a New Crop of Workers: Training and Nurturing Replace Bidding Wars." *The Washington Post.* December 1, 1997, p. A1.

4 Statistics like real median household income and real earnings are affected by the consumer price index (CPI). The Boskin Commission estimated that the current CPI overstates inflation by 1.1 percentage points per year. Although removing CPI bias would change some of the details of productivity and income trends, it would not alter our views of an increase in income inequality over the past two decades or the fact that real wages are growing more slowly than in the 1950s or 1960s. Source: U.S. Department of Labor. *Economic Report of the President.* February 1997, p. 71.

5 Wages make up roughly three-quarters of total family income with the remaining quarter made up of capital income, such as rent, dividends, interest payments, and capital gains.

6 For more than a decade, concern has been growing about the relationship between competitiveness and the inadequate skills of American workers. In 1983, in "A Nation at Risk," the National Commission on Excellence in Education chillingly concluded that a "rising tide of mediocrity threatens our very future as a nation and a people." That was followed by the Hudson Institute's "Workforce 2000" (published in 1987), which stressed the long-term implications of a growing skills shortage in the United States. In June 1990, The Report of The Commission on the Skills of American Workforce "America's Choice: High Skills or Low Wages!" was released, warning that the country was, without realizing it, choosing a road to low-wage jobs. The only solution was to upgrade our education and training systems. Finally, the Secretary's Commission on Achieving Necessary Skills (SCANS) published its initial report, "What Work Requires of Schools" in 1991, which concluded that schools were not teaching students the basic skills needed to succeed in the workplace. The Commission recommended that the nation's school systems make SCANS foundation skills and workplace competencies explicit objectives of instruction. These four reports have made headlines around the nation and raised concerns that the supply of skills in the U.S. economy has not kept place with the growing demand.

7 Burtless, Gary. "Worsening American Income Inequality: Is World Trade to Blame?" *The Brookings Review.* Spring 1996, pp. 27–31.

8 Richard Freeman is among the many economists who have tried to analyze why the U.S. is experiencing growing income inequality. Source: Freeman, Richard B. *When Earnings Diverge: Causes, Consequences, and Cures for the New Inequality in the U.S.* Washington, DC: National Policy Association, 1997.

9 Robert Lawrence of Havard's John F. Kennedy School of Government and Paul Krugman at the Massachusetts Institute of Technology are the leading advocates of this position.

10 Shepherd, Bill. "Defusing Globalization: A View From Washington." *Global Finance.* November 1997, p. 38.

11 U.S. Department of Education, Office of Educational Research and Improvement. Third International Mathematics and Science Study (TIMSS), 1997.

12 National Research Council. Cited in Information Technology Association of America's *Help Wanted: The IT Workforce Gap at the Dawn of a New Century.* Arlington, VA, 1997.

13 U.S. Department of Labor, Bureau of Labor Statistics. "College Enrollment and Work Activity of 1996 High School Graduates." July 1997. Information from the Current Population Survey.

14 Cassidy, John. "The Melting Pot Myth." *The New Yorker.* July 14, 1997, p. 41.

15 There are a lot of government data and policy groups that make this point. This was drawn from Mishel, Bernstein, and Schmitt. *The State of Working America 1997.* Economic Policy Institute, p. 50.

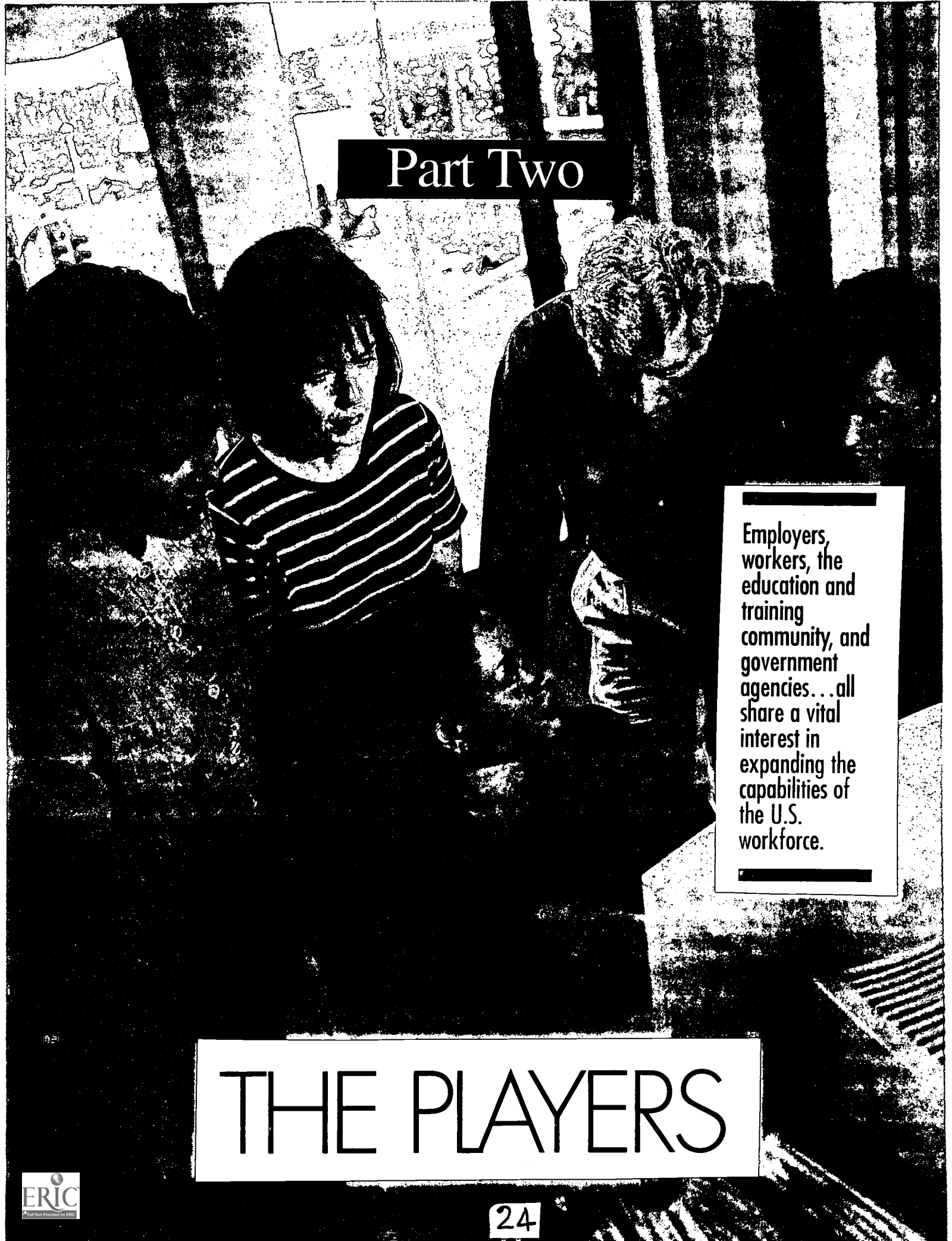
16 Freeman, Richard B. *When Earnings Diverge: Causes, Consequences, and Cures for the New Inequality in the U.S.* Washington, DC: National Policy Association. 1997, p. 46.

17 U.S. Bureau of the Census, March 1994 Current Population Survey data. Cited in: Annie E. Casey Foundation,*Kids Count Data Book.* 1996, p. 5.

18 Annie E. Casey Foundation, *Kids Count Data Book.* 1996, p. 7.

19 U.S. Bureau of the Census. Current Population Survey data.

20 Cited in *The Wall Street Journal.* July 29, 1997, p. A1.



Part Two

Employers, workers, the education and training community, and government agencies...all share a vital interest in expanding the capabilities of the U.S. workforce.

THE PLAYERS

THE PLAYERS

Employers, workers, the education and training community, and government agencies are the four major stakeholders in workforce preparation. All share a vital interest in expanding the capabilities of the U.S. workforce: **Employers** seek increased productivity to strengthen the bottom line. This goal requires a workforce that can adapt quickly to new tasks and to new market demands. **Workers** seek higher wages and job market security, which they can attain only by investing in their own skills. **Educators and trainers** face rising expectations from students, workers, employers, and communities to meet the increased demand to develop skills. Their future depends on being able to successfully place graduates into the market. **Federal, state, and local government agencies** see that their efforts in workforce development programs must be more focused and more localized to generate economic growth.

This chapter outlines the interests of the stakeholders and shows why they cannot run alone.

Part Two

AMES RUBBER CORPORATION

Ames Rubber Corporation is acutely aware that the mismatch between workers and jobs hurts the firm's ability to grow and prosper. Located in a rural, farming community in northern New Jersey, Ames Rubber is particularly limited by the area's low unemployment levels and geographic isolation. Charles Roberts, vice president of total quality, identifies many of the problems and prospects:

"It's almost impossible to find skilled labor. Even though our requirements are minimal (workers with basic verbal skills who are able to do calculations and perform math at an eighth-grade level), we are compelled to put a lot of time and resources into remedial efforts because our recruiting options are so poor. Job applicants are told up-front that they will be tested for basic competencies and that those without basic skills will need to bring themselves up to speed if they expect raises and promotions within the company.

We feel we're giving workers a second chance by helping them improve their basic literacy skills, but it's a difficult undertaking for many. Although we are committed to not laying off workers due to quality improvements, those workers who refuse to upgrade their skills face a dim future — not only for this job, but down the road when workplaces demand even more sophisticated skill sets. Employability is key to job security. And to stay employable, workers must be willing and able to learn throughout their lifetimes. For those who maintain and improve their skills, the changes should bring increasing rewards. For those who fall behind the curve, the way out is more costly, and more remote.

We realize that remedial education is a short-term, band-aid solution and that real change has to happen through K–12 reform. The schools are not graduating students with the necessary skills. We need to be better about articulating our skill needs, disseminating them to the schools, and assisting in redesigning curricula.

School-to-work that marries meaningful work-based learning experiences with challenging academics is considered by many to be a best practice, although it has not yet been brought to scale anywhere in the United States. Partnerships between business, schools, and other community players can help improve learning and can give students an early glimpse at what competencies are needed to excel in the world of work."

Why Business Can't Run Alone

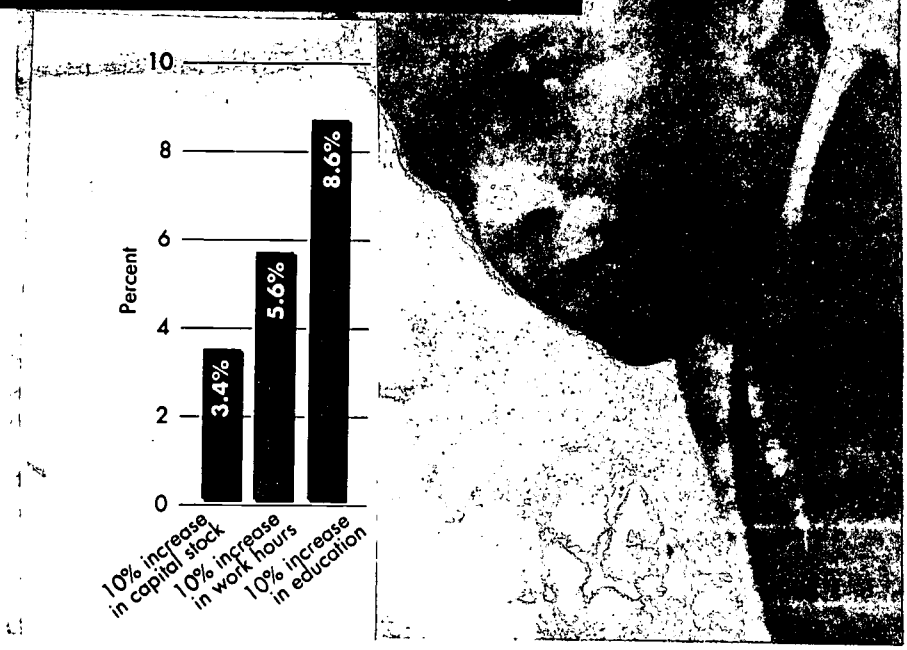
Companies like **Ames Rubber** are overwhelmed by how multidimensional their training needs are. They not only have a baseline requirement for workers who can read and do simple math, but also are calling on increasing numbers of employees to communicate well, use technology, solve problems, think critically, and understand the larger business context.

The training agenda for business starts with basic skills and workplace fundamentals. Entry-level workers unfamiliar with the work environment must learn how to meet even the simplest requirements to show up on time and notify superiors of absences. Yet many workers (even those with high school diplomas) lack basic competencies in reading, writing, math, and computers. Unless **Eastman Kodak Company** employees have a solid understanding of basic math, for example, they cannot comprehend how to build or use formulas on an Excel spreadsheet. For companies like Kodak that have spent millions of dollars on statistical process control systems, poor math preparation is a major stumbling block that often hinders their ability to quickly roll out sophisticated operational conversions.

Beyond the fundamentals, pressure is mounting to continuously upgrade the skills of incumbent workers. More than ever, employed workers are participating in skill improvement training for their current jobs.[1] Rapid workplace changes mean workers' knowledge has to be continuously updated. More than half of companies surveyed in a Bureau of Labor Statistics (BLS) study provided training to upgrade or reorient worker skills in response to changes in technology, production methods, or both.[2] This level of continuous learning isn't surprising to firms like **Hewlett-Packard,** where new products and services are being introduced every year, placing new demands on all employees — from the factory floor to senior management.

Training requirements are ratcheted up in the knowledge-based economy, and they now outpace the capacity of firms to respond. Although employers spent an estimated $55.3 billion in 1995 on formal training for the civilian workforce, employer-provided training does not appear to have kept pace with the increase in the number of workers over the past 15 years.[3] Training expenditures per worker appear to have fallen,[4] despite the fact that training pays off. Employers achieve an 8.6 percent improvement in productivity for every year of worker education.[5] *(See Figure AA.)* For that same year, employees who receive training enjoy wages as much as 16 percent higher than comparable workers who do not receive training (even after controlling for education levels and a variety of

Figure AA
Additional Education Boosts Productivity More Than Other Inputs



Source: Fig. AA: National Center on the Educational Quality of the Workforce. "The Other Shoe: Education's Contribution to the Productivity of Establishments." 1995.

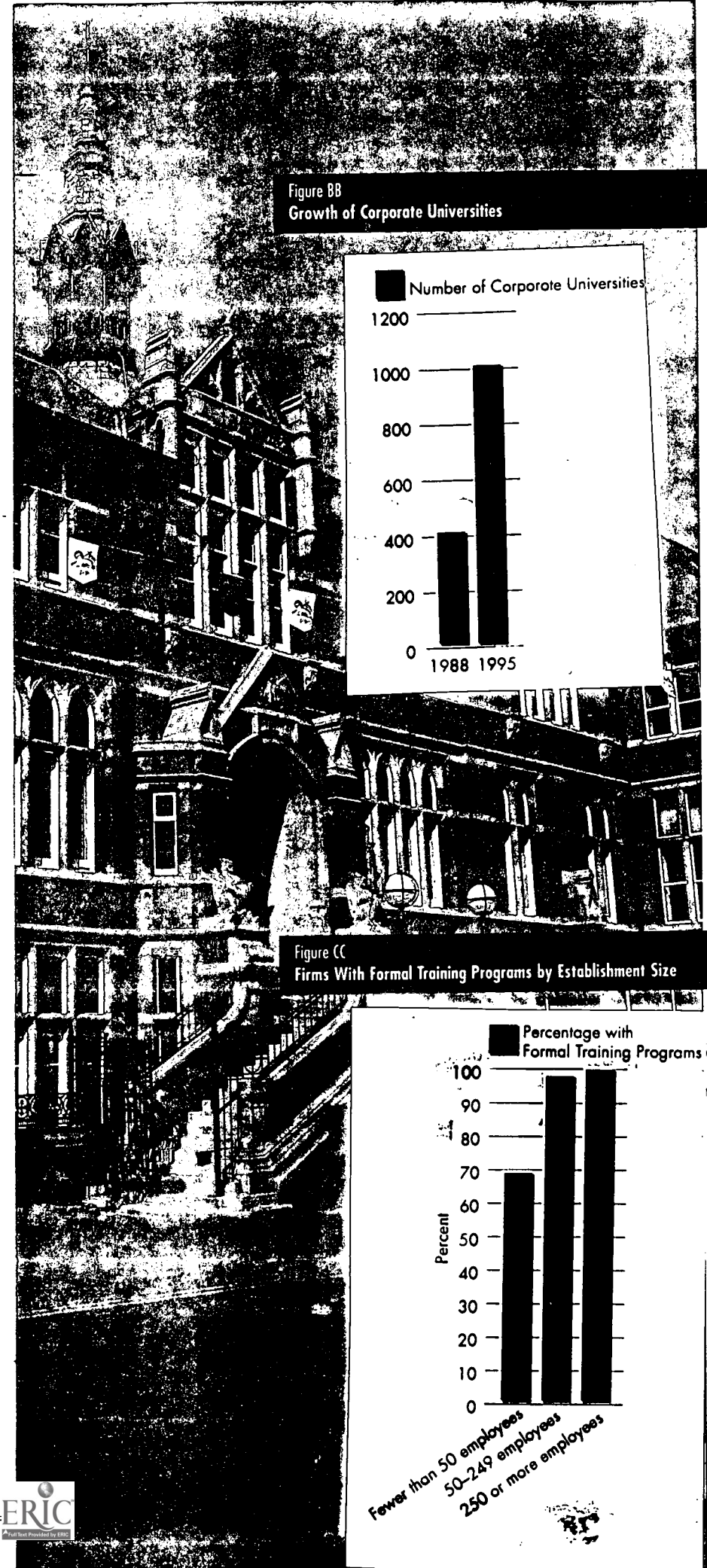


Figure BB
Growth of Corporate Universities

Figure CC
Firms With Formal Training Programs by Establishment Size

other factors that affect earnings).[6]

The response of U.S. firms to rising demands for training is, at best, uneven. Only a small fraction of private industry invests in preparing its *overall* workforce. Indeed, workplace training tends to favor the advantaged; although those with college degrees represent only 25 percent of the workforce, they received 38 percent of the training in 1991. Conversely, those with a high school education or less got 38 percent of the training but represent 53 percent of the workforce.[7]

The 70 percent of employers that *do* conduct formal training assign particular priority to what feeds into the bottom line of company operations. While companies routinely invest in computer training, for example, a very small percentage of all establishments offer formal training in basic reading, writing, arithmetic, and English language skills.[8] Yet, in surveys done by the Olsten Corporation, almost half of employers reported that their workers needed to enhance their reading or math skills in 1994 — twice as many who reported so just three years earlier.[9] Data like this are common and point to basic skills training needs that far exceed employers' efforts to provide such training.

Some of the biggest companies are demonstrating their commitment to learning by creating education/training units within the corporate structure. These "corporate universities" have grown from 400 in 1988 to more than 1,000 in 1995 (now estimated at 1,200 to 1,500).[10] *(See Figure BB.)* But a significant portion of these training expenditures are by large manufacturing firms and directed to professional and managerial staff, not front-line workers.

Large firms like **Xerox Corporation**, which invests substantial sums in training its workforce, are exploring more decen-

Source: Fig. BB: Quality Dynamics Inc. 1996 Survey of Corporate University Future Directions.
Fig. CC: Bureau of Labor Statistics, 1993 Survey of Employer-Provided Training.

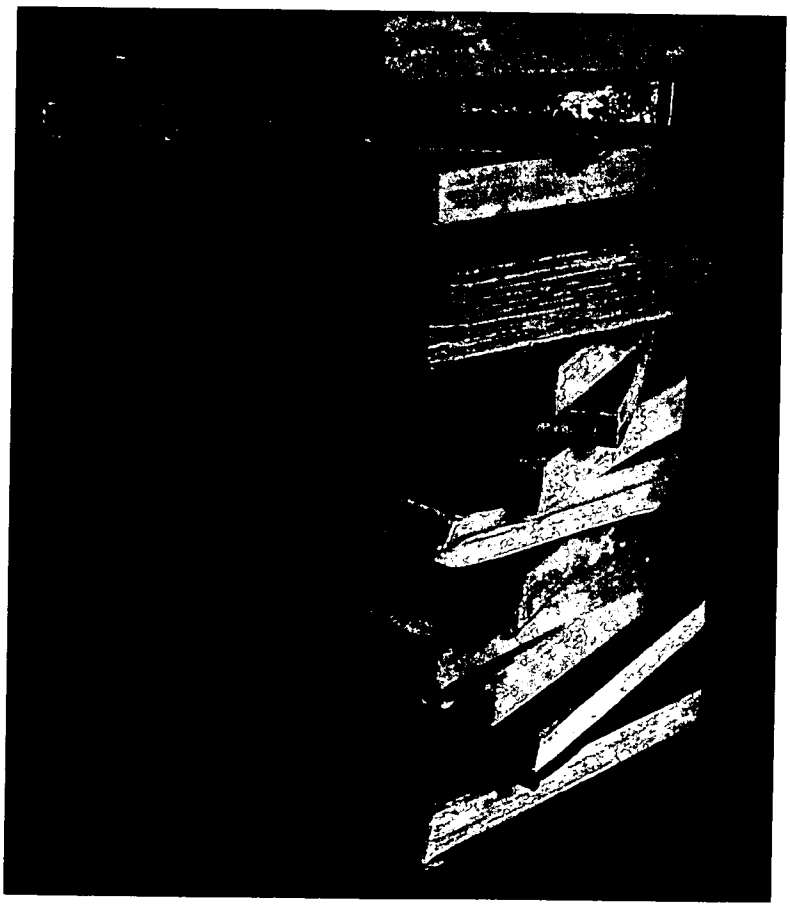
tralized strategies that allow employees to pursue the training and educational opportunities they deem appropriate. Managers within each business division identify learning opportunities for employees, based on their selected career paths. As corporate training departments shrink,[11] firms are relying on such decentralized strategies to ensure that the workforce continues to improve its skills and that employees have the learning opportunities they need to move up the ranks. This trend puts added pressure on each division of large companies to make smart, cost-effective investments.

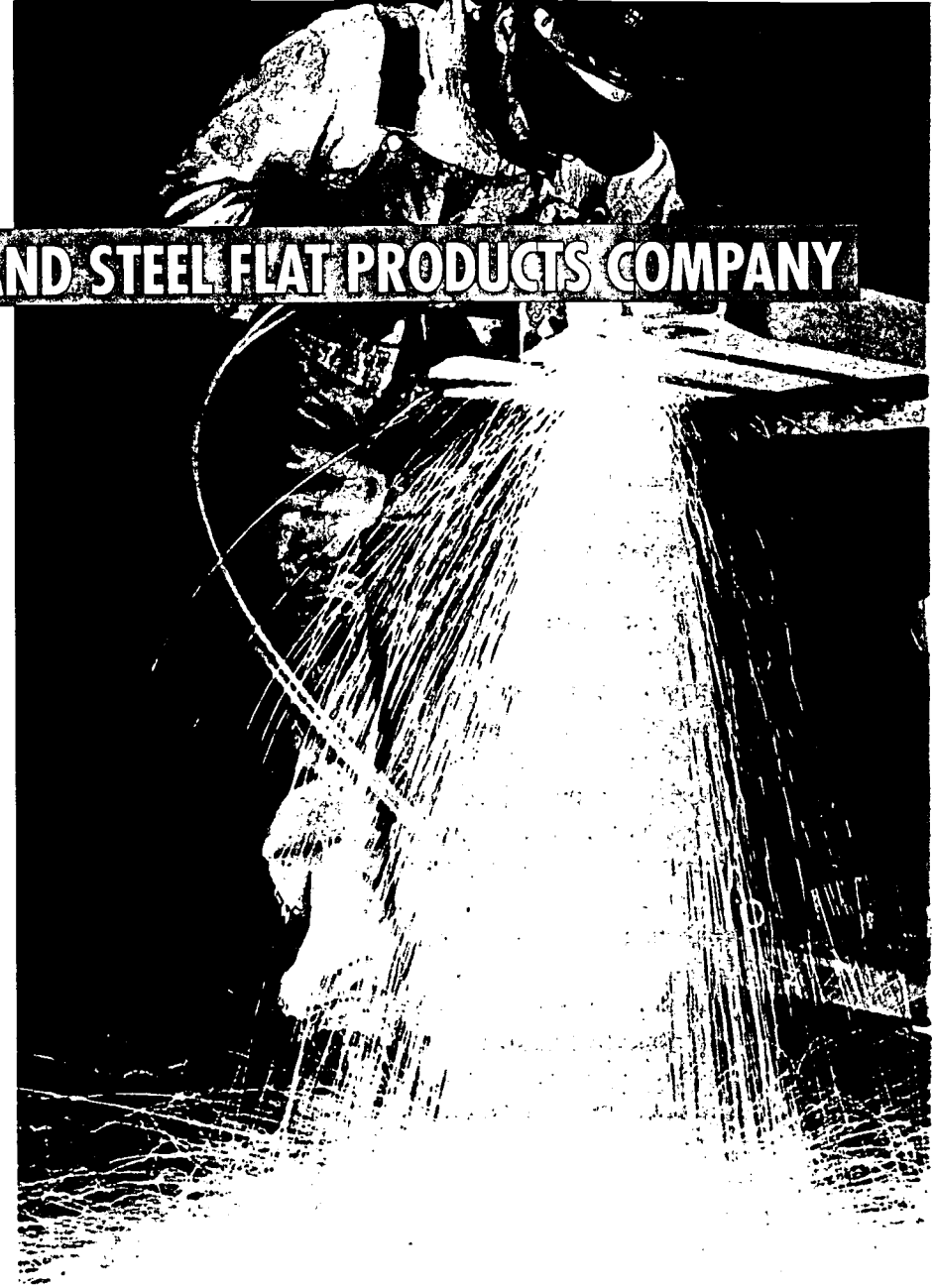
Small and mid-sized companies are major job generators in the U.S. economy, yet their workers operate at a distinct disadvantage. The BLS studies show that smaller firms are far less likely than their larger corporate counterparts to train their workers. Small firms spend approximately one-third as much per employee on formal training as do large employers.[12] Yet, small business training needs are critical. These firms not only provide the first work experience for two out of three workers, they are also important providers/suppliers to larger companies that rely on services/goods of smaller firms to beat global competition.

Many small firms are severely limited by a lack of personnel, funding, and the benefit of economies of scale. As *Figure CC* shows, almost all private sector establishments with 50 or more employees provided some formal training programs for workers. But just 69 percent of employers with fewer than 50 employees provided any formal training.[13] And, according to the Small Business Administration, less than one-fifth of firms with fewer than 25 employees have comprehensive training programs.[14]

Smaller firms have trouble rationalizing the costs of formal training, which can include employee testing and assessment, employee development plans, and performance-based evaluation systems. All of this means time away from the job and lost productivity, for both the trainer and trainee. And because worker training can be expensive, small firms in particular fear that their employees will take their new skills and knowledge and go elsewhere for employment. This issue came up repeatedly during our own focus group discussions, although studies have shown that participation in employer-provided training actually reduces the likelihood of an employee leaving the employer.[15] And given the job churning in today's market, small firms are particularly sensitive to the costs of locating and training replacement workers — costs that can quickly become prohibitive.

New training requirements have left all firms in a state of flux. Employers are struggling to determine where to allocate resources, which training tools to use, and how to maximize their impact.





INLAND STEEL FLAT PRODUCTS COMPANY

As a member of United Steelworkers of America Local 1010, Nick Nash and other hourly workers at Inland Steel Flat Products Company in East Chicago, Indiana, are the beneficiaries of a labor-management contract that sponsors on-site classes through the JobLink 2000 center. Nick has taken advantage of the opportunity to take courses relating to personal development, retirement, or future academic needs, at no cost. JobLink, he says, has opened new doors for him:

"I first took a class in Residential Wiring in 1994. I was doing some work on my home and wanted to pick up the skills needed to rewire my garage. I enjoyed it so much I enrolled in Carpentry I and II and Advanced Carpentry I and II. I then had the skills to build a deck around my house. Knowing how to do it by myself saved me a lot of money, and it was very rewarding to complete such a major project.

I continued with other home-improvement classes, each lasting about four months, but then I also began branching into computer courses. JobLink offers courses ranging from the basics like keyboarding, word processing, and using the Internet to sophisticated desktop publishing and spreadsheets. And most recently, I took flying lessons with the money available through the Tuition Assistance Program offered by Inland.

The experiences have really helped me think about what I'll do after I leave Inland. Jobs are no longer secure in this industry, and there's always retirement. I think I want to build a log cabin for myself, possibly in New Mexico. And in the meantime, I have improved my reading abilities, sharpened by math skills, and gained a lot of confidence about being a 'student' again. I plan to keep taking classes as long as I can."

Why Workers/Unions Can't Run Alone

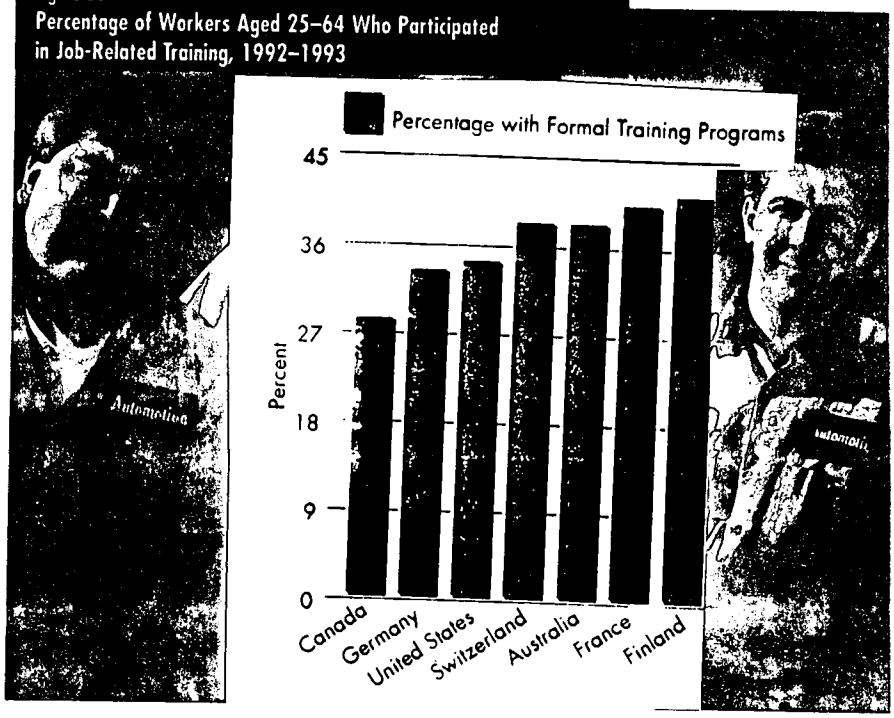
Workers, like Nick Nash, ever less secure about their positions and prospects, are increasingly aware of the need to boost their skills and marketability. But often, they lack the perspective and opportunity to realize that goal.

Overall, U.S. workers get roughly the same share of job-related training as in other major countries. *(See Figure DD.)* But formal training is biased toward the haves. It typically favors: the college educated; men, who have both a longer history in the workforce and who pose little threat of leaving work for child rearing; whites over blacks and other minorities; and workers between the ages of 35 and 44 — a group that has logged enough time on the job to be valuable and not too much time to soon be considered obsolete.[16]

Unionized workers, making up roughly 10 percent of the industrial workforce, are more likely to receive formal company-provided training than nonunionized workers.[17] For workers looking to transition into new jobs within the same company, those in unionized firms often benefit from job training programs that are a product of labor-management collaboration. Collective bargaining objectives have shifted from *job security*, or keeping one's present position, to *employment security,* which ensures workers opportunities in the broader job market. Labor and management work together to provide opportunities for union members who receive training and education to improve existing skills or to learn new skills for greater employability.

For example, through the collective bargaining process, **Inland Steel** has committed to training 10 percent of its unionized workforce at any particular time. These worker education programs have proven so effective that the number is more like 25 percent according to workers and managers. To increase job opportunities within the firm, the steel producer instituted something called "criterion referenced instruction" — a complex system that clearly identifies the skills and knowledge needed to successfully perform 400 jobs in the plant. Because of the constant introduction of new equipment and new processes, labor and management wanted to devise a system that clearly laid out job qualifications, encouraging workers to upgrade their skills and making it easier to obtain new positions within Inland.

Figure DD
Percentage of Workers Aged 25–64 Who Participated in Job-Related Training, 1992–1993



Beyond training in the workplace, some firms underwrite the schooling costs for workers. By 1995, 65 percent of employees at medium and large firms were eligible for job-related tuition benefits, and 18 percent could get financial help for courses not related to their jobs.[18] And workers are taking advantage. Nearly half of the 14.2 million college and university students in the United States are over 24 years old, and that percentage of

Source: Fig. DD: Organization for Economic Cooperation and Development, Education at a Glance: OECD Indicators, Indicator P8, 1995.

older students — most of them coming back to school after years in the workforce — is still rising.[19] The 1998 tax law recognizes this trend and offers several different kinds of credits that can be used to help offset college costs.

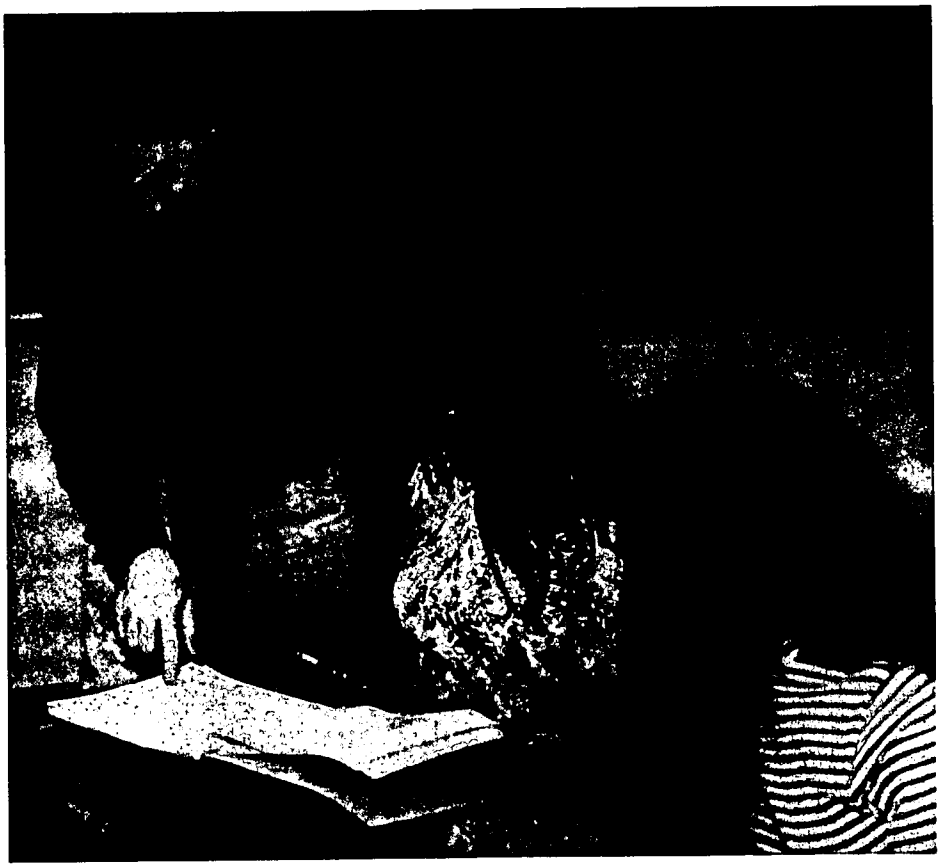
But those workers who, on their own, choose to pursue education and training through outside sources, are by no means guaranteed that their investments will pay off in higher wages or career opportunities. While work-based training increases individual earnings, the benefits are not as clear when individuals go it alone

Even the most reputable education and training programs do not always ensure that their programs are tailored to business needs. In too many instances, workers have no way of knowing if the courses they are taking, often on an ad hoc basis, are tooling them with the "right" skills. And although the training may be valuable, most individuals do not receive portable credentials or certification unless they pursue full degrees.

For would-be new entrants and incumbent workers, the problem is two-pronged. First, individuals themselves are not taking the initiative, often because they lack good information about what skills they need, how they can be acquired, and where they can be applied. Second, for those with the motivation, learning opportunities are often severely limited by time, expense, and lack of availability. As learning becomes a lifelong need, no worker will reach his or her potential without ready access to quality skills training.

VALENCIA COMMUNITY COLLEGE

Valencia Community College in central Florida has been ahead of the national pack in designing education/ vocational programs that connect its participants directly to the job market. Susan Kelley, Valencia's vice president of resource development and governmental relations, has worked closely with government agencies and private firms to rationalize the costs associated with workforce preparedness. She's intent on showing results:



"That's what community colleges can do and should do; it's why industry pays taxes. Valencia is an active partner in local economic development. We anticipate opportunities for economic expansion and work directly with businesses to maximize those opportunities. Everyone wins, and the region's economy is boosted.

I was an early supporter of performance-based funding and budgeting for public educational institutions in Florida. Colleges now must risk 20 percent of their funding and prove to the state that they can successfully place graduates in promising fields identified by the state's occupational forecasts. This element of competition keeps everyone sharper. We regularly track job placements and survey employers on their skill needs, and it's paying off — Valencia has earned back more than its 20 percent every year.

We partner with all Central Florida businesses, from entertainment and hospitality to health care and the film industry. Our students must be trained so they leave ready to work in a good paying job...a job that exists. This is especially critical with the effects of welfare reform. An estimated 45,000 welfare recipients will try to leave the Central Florida's rolls over the next two years. We have to ensure that our education and training programs are designed to meet the needs of the long-term unemployed and satisfy job requirements."

Figure EE
Remedial Education in Higher Education Institutions (1995)

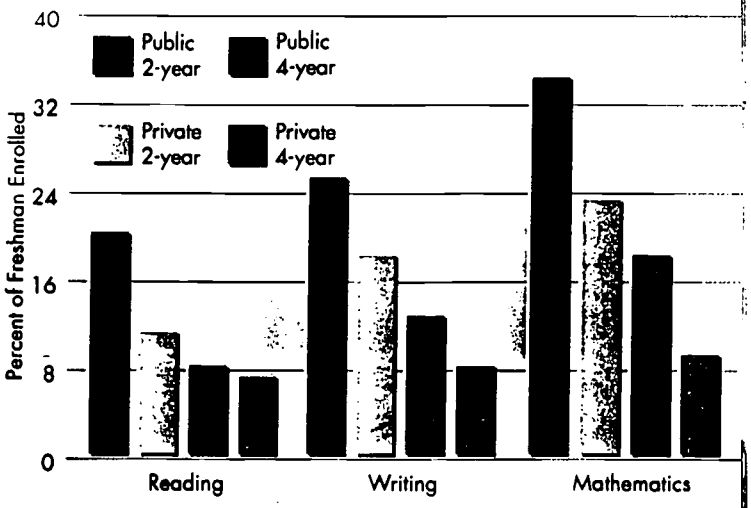
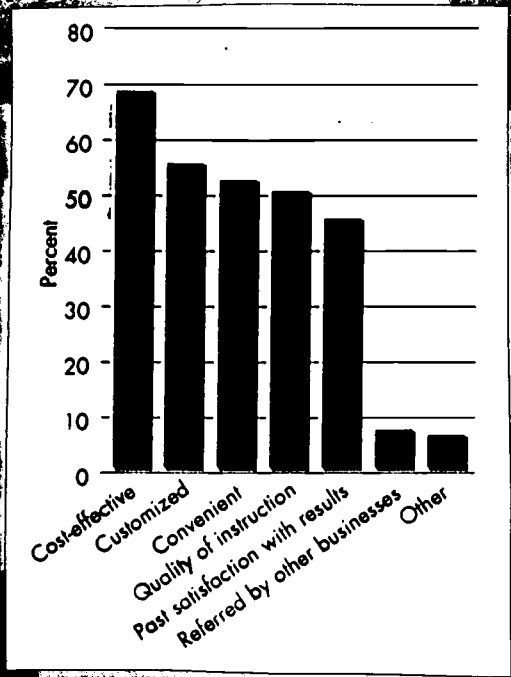


Figure FF
Reasons for Choosing Community Colleges for Workforce Education Training



Why Educators and Trainers Can't Run Alone

Educators like Susan Kelley recognize that the success of schools is very much dependent on the economic success of the communities in which they reside. No matter what level of post-secondary institution — from the research universities to community colleges — the value of all education and training providers is measured by their direct contribution to economic development.

A particular challenge for post-secondary schools is the number of students who leave high school unprepared for higher learning. In most medium-sized to large four-year colleges, at least one-fourth of the freshmen require remedial education in mathematics and reading before they can do college-level work.[20] And two-fifths of freshmen in public two-year colleges register for remedial courses. As *Figure EE* shows, America's well-regarded system of higher education is devoting too many resources to *re-do* what should have been done already.

Meanwhile, schools are enrolling more and more older students, who are motivated by increasing educational requirements for employment, changing life circumstances, and personal growth. Currently, more than 50 percent of higher education students work — and their goals are to upgrade, retrain, or advance.[21] Because four-year universities, in general, have not emphasized learning for work, students looking for practical educational avenues into the workplace often turn to community colleges.

Education for work has long been a key component of the community college mandate. These institutions are within commuting distance for most of the population; they are community-centered and often have ties to business and industry;

Source: Fig. EE: U.S. Department of Education, National Center for Education Statistics, Remedial Education at Higher Education Institutions in Fall 1995.
Fig. FF: Developing the World's Best Workforce: An Agenda for America's Community Colleges. Community College Press, 1997.

they are relatively inexpensive; and their open enrollment policies make them accessible to all. *(See Figure FF.)*

But as the hubs of continuous learning, community colleges are being pressured to do more than just provide flexible, cost-effective courses. The pressures are from students and employers — those who receive the training and those who finance it — who demand a clear return on their investment.

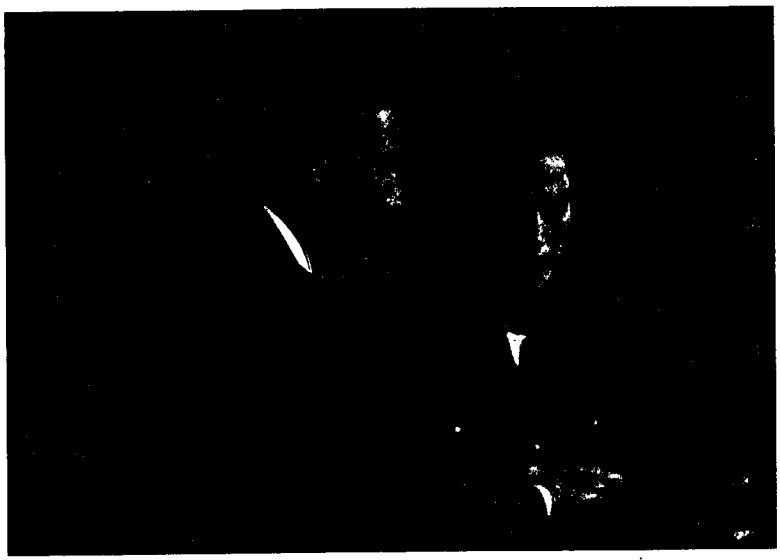
Successful community colleges are increasingly customer conscious and responsive to firms large and small. **Valencia Community College's Office of Corporate Services** actively seeks out Orlando-based firms that would benefit from on-site needs assessments and evaluations, training and education, customized course development, and continuing professional education courses. With less than four percent unemployment, local businesses are clamoring for the school's help in educating both entry-level and incumbent workers. And the school's client base (which has grown ten-fold since 1992) not only expands its reach in the community, it reaps additional revenue.

If community colleges do not measure up, firms can turn to alternate sources. Many newcomers in the education and training field are cashing in on a skyrocketing demand for their services. Some of the stiffest competitors are private providers responding to the wave of firms outsourcing many of their training functions. The combined sales of **Knowledge Universe**, a Los Angeles-based holding company of training and consulting firms, were forecast to reach $1 billion by 1998. According to one estimate, the market for information technology education and training services alone was $4.4 billion in 1996 and is expected to grow to $7.4 billion in 2001.[22] The American Society for Training & Development (ASTD) recently found that the market value of firms providing customized training has appreciated at more than twice the rate of Standard & Poor's 400 Industrials over the past two years.[23]

Post-secondary education, whether publicly or privately funded, will have to meet the rising demands of workers and employers for marketable skills, as well as the expectations of community leaders for economic development.

WASHINGTON STATE'S WORKFORCE TRAINING AND EDUCATION COORDINATING BOARD

Washington State's Workforce Training and Education Coordinating Board, which advises the governor and legislature on workforce development policy, deals directly with Washington's employers and workers. Only after identifying the major gaps in the supply and demand for training can the Board strategize how to best serve its customers. Board Chair Betty Jane Narver explains:



"Education and training are critical to the economic growth of Washington. If employers cannot find trained workers locally, they will look to other states or nations, or they will have to design new jobs that do not require high skills or pay high wages. The state has to coordinate its economic development and workforce training programs to encourage the growth of high-performance firms where workers participate in decisions, work in cross-functional teams, and manage their own career development.

Shortages are particularly critical in occupations that require technical training beyond the high school level. A recent survey found that 81 percent of employers who tried to hire workers with a vocational degree or certificate had difficulty finding qualified applicants. Each year, the state produces less than 21,000 graduates with two years of post-secondary vocational training, although there are about 28,000 job openings per year. And many businesses expect their need for such workers to increase over the next five years. Community and technical colleges need to market their offerings better by showing students how valuable a two-year degree is in the market. In particular, degrees in computer science and computer engineering are in high demand.

Firms are also in need of retraining services for their incumbent workforces. Although the students who attend community and technical colleges for workforce training are generally satisfied, many employers perceive a mismatch between the kinds of training they are seeking for their current workers and that offered by public providers.

It is the Board's job to ensure that the state's workforce training and education system meets these needs. And to do that, we have to give both of our customers – business and labor – a voice and the opportunity to shape education and training in their local communities."

Why Government Can't Run Alone

Washington State's intensive efforts to match education and training with market demands are emblematic of efforts in state capitals across the country to keep and attract high-wage jobs. States like Washington recognize that competition for economic development can be won or lost by the availability of trained workers. To win this battle against other states and against locations around the world, they are developing and delivering comprehensive employment services designed to serve their local populations, including labor market information, training, job counseling, and placement.

With an eye toward economic development, 47 states now offer some type of customized job training program to existing or new businesses. States have stepped up their investments in economic development, on average, by about 29 percent a year over the last 10 years (totaling $2 billion in 1994). This and other analysis by the National Alliance of Business shows that states that have a more educated workforce and that devote more state and local resources to education see improved economic performance.[24]

But there are risks in the intense competition among states to keep or attract corporate investment. The AFL-CIO, for instance, takes issue with states that are too anxious to accommodate business needs and may, in effect, distort the original purpose of training dollars to attract firms. The labor organization points to the 1993 case in which Alabama enticed Mercedes to build an automobile plant within its borders by extending tax abatements that actually reduced resources for a state special education trust fund. Although a new governor stepped in with an alternative incentive for the company, the AFL-CIO and other critics still question whether such decisions are the best use of limited resources. But states argue that such investments pay off in terms of new jobs and long-term economic growth.

The federal government is a level removed from the firing line of workforce development. Federally sponsored job training programs are designed for mostly disadvantaged workers who would not receive such training from an employer or could not pay for it themselves. The annual federal investment in targeted programs, estimated at $25 billion, is geared mostly to at-risk groups such as dislocated workers, low-income individuals facing significant barriers to employment, and youths who have the potential to benefit from second-chance programs.[25]

On the whole, these targeted federal programs have received low marks for effectiveness. Critics contend that the multitude of narrowly focused programs are competing for clients and funds, while administrative overlap makes the system inefficient and difficult to navigate. In 1995, the General Accounting Office concluded that approximately 40 percent of the federal employment and training programs could not accurately identify how many people they served per year. Less than half of these programs tracked participants' success in getting jobs. Only a quarter collected data on wages earned.[26]

In response, the federal government is directing state and municipal governments to improve administration and increase access by implementing programs at the local level. The U.S. Department of Labor provides funds to assist states in developing one-stop career centers that help with recruitment, training, and hiring for both job-seekers and employers.[27] One-stop centers provide a single entry point by unifying the patchwork of fragmented employment and training programs, thereby creating a more efficient system.

In addition, the federal government is increasingly becoming an initiator and a catalyst for a series of major national programs that go beyond specific classes of

With an eye toward economic development, 47 states now offer some type of customized job training program to existing or new businesses.

workers. Two of the most promising federal initiatives, school-to-work and occupational skill standards, address workforce challenges that the private sector cannot be expected to meet on its own. Both of these initiatives (discussed in this chapter) recognize the power of devolution by providing for implementation at the local level.

Why the Players Need to Run Together

Industry, workers, educators, and government officials are not always natural partners, but they are pooling their resources and expertise to tackle issues that they cannot manage on their own. Their core shared interests are the following:

1) to improve the pipeline from K–12 to work,
2) to leverage scarce training resources, and
3) to respond to market pressures.

Improving the Pipeline from K–12 to Work

Public and private sector leaders have begun to work in partnership across the country to ease the transition from K–12 to the workplace.

Congress created a framework to promote such partnerships, the School-to-Work Opportunities Act of 1994, which provides temporary planning and implementation grants to states and local communities on a competitive basis. The rationale is that states and localities should be able to design systems that reflect their own economies and that respond to their own labor market needs. For school-to-work to be successful, businesses, labor unions, schools, parents, local officials, and community-based organizations must work together. School-to-work programs give all students academic and technical training and link learning in school with the demands of the workplace.

Early evaluations suggest that school-to-work is a success story in progress. Businesses that participate have seen their recruitment costs drop and experience less turnover among new hires.[28] And students benefit from the work experience. A recent study found that a student who went directly into the workforce after high school and worked a substantial number of hours during school (15–20 hours a week), drew significantly and substantively higher earnings.[29]

The school-to-work concept has started to catch on even without the catalyst of federal grants. **Intel's** lead in New Mexico, for example, is typical of many firms turning to education partners for a reliable supply of skilled workers. The hands-on science learning centers developed by company managers proved so successful that they were adopted by the New Mexico State Department of Education. Intel also introduced special manufacturing classes at the K–12 schools statewide, arranged work-site opportunities for students, and offered teacher internships. The current enrollment of more than 1,500 in the post-secondary manufacturing technology degree program developed by Intel shows that students are starting to see the opportunities.

In Milwaukee, an area that lost 60,000 high-wage manufacturing jobs in the 1980s, manufacturers have banded together to regain the community's confidence in vocational education. Parents, students, and guidance counselors had turned away from this blue-collar track because it was not considered a pathway to a high-paying career. In recent years, however, local manufacturing firms and unions have established school-to-work links and youth apprenticeship opportunities to renew interest in fast-growing occupations that do not require four-year degrees. Today Milwaukee's school-to-work program is much heralded for its efforts to teach *all* children in an applied fashion, beginning in elementary school.

A nationwide coalition of service sector firms has formed a network of

SCHOOL-TO-WORK SYSTEM

The National School-to-Work Office has identified eight core principles that are key to developing school-to-work systems.

1) School-to-work opportunities are intended for all students.
All students — including the disabled, school dropouts, and academically talented learners — benefit from challenging, contextual learning. Unfortunately, many misunderstand school-to-work and treat it as enhanced vocational education for the "non-college bound." But all students can benefit from learning that is benchmarked to high academic standards.

2) School-to-work elements are incorporated throughout the school curriculum.
Career awareness and exploration must begin as early as possible. School-to-work principles can be put into simple exercises for younger students, while high schoolers participate in sophisticated work-based learning opportunities. The system builds incrementally, preparing students for each progressive step.

3) All partners involved in implementing school-to-work must be trained and given staff development opportunities.
Teachers and career counselors need to work directly with employers to learn about particular industries and workplace practices. Staff may also require training in contextual learning, portfolio assessment, and the use of technology. Employers and unions need to learn how to develop work-based learning experiences, mentoring curricula, and skill standards.

4) School-to-work systems enable students to explore "all aspects of an industry."
Building on an area first emphasized in tech-prep programs, students receive broad exposure to issues and skills related to their career of interest, rather than learning isolated task- or job-specific skills.

5) Employers and labor unions play a key role in building school-to-work systems.
Employers and unions are equal partners with education, although their involvement may vary. Firms can offer job shadowing, sponsor teacher internships, develop skill standards, and/or offer full work-based internships. Unions often concentrate on job training and workplace health and safety issues.

6) Learning is organized around career majors, which provide a context for learning and allow for connections between school-based and work-based learning.
Career majors help students learn how their strengths and career goals match with a variety of occupations. The application of lessons at an early age is key to steering students toward post-secondary and employment options.

7) States identify a "roll-out strategy" to local partnerships.
Because system-building is a long-term activity, states must have plans for spreading school-to-work to every community. Local partnerships are usually required to demonstrate through a competitive process that they are ready to implement school-to-work.

8) All partners are responsible for ensuring that their systems yield results, which are measurable and drive continuous improvement efforts.
Successful school-to-work systems can document improvement of academic performance, students' development of job skills, high level of involvement by employers and schools, and favorable labor market experience of graduates. For school-to-work to establish itself as a self-sustaining, national movement, grantees will have to demonstrate their success in qualitative measures like these.

Employers see school-to-work as a way to secure for themselves a pipeline of graduates whose skills meet their needs.

"academies" within high schools that prepare students, many of whom are considered "high risk" for dropping out, for careers in the financial services and travel and tourism industries. This **National Academy Foundation** (NAF) has a strong track record in exposing students to job and career opportunities through student internships. For the students, the work experience reinforces the importance of schooling and gives them new incentives to graduate. For businesses, soon-to-be new entrants who work in their industries help the employers build pools of qualified workers. Virtually all students involved in NAF programs graduate from high school, and more than 90 percent go on to college.

Employers see school-to-work as a way to motivate students to perform in high school and to secure for themselves a pipeline of graduates whose skills meet their needs.

Leveraging Scarce Training Resources

The magnitude of the training challenge has prompted many firms to form alliances with other firms and organizations in their communities that offer specialized expertise, information links, and economies of scale. Learning partnerships are of special value to small and medium-sized companies:

Oregon-based **Merix Corporation**, a medium-sized electronics manufacturer, has developed a network of ties with local educational institutions — two and four-year universities, technical schools, community colleges — to meet its training needs. Often, the schools are hired to develop the class material, and Merix does the training at the corporation's facilities. Merix has found these outside educational suppliers, who know Merix's business, to be especially productive partners.

Solectron, a surface mount technology manufacturer in Milpitas, California, has forged a long-term learning partnership with the nearby **Center for Employment Training** (CET) that has generated substantial benefits for both the firm and the school. The company shares its technical skills courses, donates materials, and invites teachers to shadow company employees so that the teachers can learn more about the industry and its math and science requirements. In turn, workers spend time in the classrooms as teachers' aides and student sponsors. The exchange breeds results: Solectron now regularly hires CET graduates and regards the school as a great recruiting opportunity.

The **Wisconsin Regional Training Partnership** is a local alliance of small businesses and labor organizations that work together to improve workers' skills and to support high-performance workplaces. The members of the industry consortium see its greatest values as providing opportunities to learn from their peers, improving access to public sector services, and developing joint training programs.

Even the largest companies, with plenty of trainers on hand, are looking outward to meet worker demands for certification and portable degrees from high-quality institutions. More and more corporate universities are pairing up with accredited schools. Companies like Berlitz International, Ford Motor Company, General Electric and Xerox have certified their employee training programs so that their employees can earn college credit for training. This means workers can take their achievements with them to find jobs in other fields or geographic areas.

Motorola has long established relationships with universities and community colleges in every region in which it has a corporate presence, although it has its own university at its headquarters in Illinois. But now, it is establishing alliances in regions of the country where it anticipates launching new facilities. In Richmond, Virginia, where its new computer chip plant will be built, Motorola is work-

ing with **J. Sargeant Reynolds Community College** to recruit and train prospective employees. Instructors from the college are being certified to teach courses designed by Motorola University. This ensures J. Sargeant Reynolds a new crop of students.

The pressure to leverage resources is being felt across the board.

Responding to Market Forces

Increased demand for higher skills has spurred new initiatives to improve the access of employers and workers to training and to increase the portability of skills. What sets these initiatives apart is their reliance on implementation at the local level.

In Illinois, Governor Jim Edgar's office designed the **Prairie State 2000** program, which offers training vouchers to individuals and grants to small and medium-sized businesses. The premise of the program is that individuals and companies are in the best position to meet their own training needs. The program has hit a positive chord with many businesses pressing to keep up with technology improvements and related training demands. Preliminary findings show individuals receiving wage increases of more than eight percent during each of the first two years of the program. And employers are reporting high job retention rates for those workers who have been retrained.

Tennessee has taken a different route, based on the results of a startling survey that showed its workforce is both undereducated and undertrained compared to its 19 neighboring and regional states. In response, **Tennessee's SkillsNet** targets employers that have been hesitant, typically, to invest in workers who lack a solid foundation of skills. SkillsNet makes self-paced, computer-based classes available over the Internet. For a minimal investment, businesses can help adult workers improve their basic skills, and ultimately, their job performance.

A more comprehensive approach is the federally sponsored and locally executed **Manufacturing Extension Partnership** (MEP), which provides information, resources, and services to small and medium-sized manufacturers. MEPs use federal seed money to attract state, local, and private funding for a wide range of management services on a firm-by-firm basis. MEP workplace assistance activities often include helping firms to evaluate their training needs and to locate training service providers in the area. But MEP administrators are quick to point out that smaller firms are only willing to embrace training if they see it as part of a larger strategy to achieve business goals.

A recent national initiative on skill standards looks beyond the issue of access and seeks to improve the operation of labor markets. The goal of this congressionally sponsored effort is to develop broadly accepted measures of worker capabilities on an industry-by-industry basis. Since 1994, the National Skills Standards Board has attempted to build consensus on these measures by bringing together representatives of business, labor, academia, and community organizations. If national skill standards are successfully implemented, each of the players in the skills race should benefit. Business will be able to recruit and hire more effectively. Unions and workers will benefit from enhanced career and job opportunities. Educators and trainers will be better equipped to meet business requirements and to improve the school-to-work transition.

In all of these instances, the walls that have traditionally separated employers and schools, schools and learners, government and the private sector, are gradually breaking down. And what's emerging are interests, once narrowly defined, working together toward shared solutions.

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3 Formal training is generally defined as having a set curriculum and structure, whether it takes place in a classroom, lab, or via technology. Informal training, which is more prevalent, is spontaneous instruction that typically occurs on the job—one employee teaching a fellow worker how to perform a task. Source: Bassi, Laurie, The American Society for Training & Development (ASTD), using data from the Bureau of Labor Statistics, the U.S. Department of Education, the Economic Report of the President, and ASTD's Benchmarking Forum.

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8 Estimates of the percentage of firms providing remedial or basic skills training may vary, but all are relatively low. The Bureau of Labor Statistics' 1993 Survey of Employer-Provided Training found that only two percent of private sector establishments offer basic skills training. A supplement to the 1991 Current Population Survey of worker training experiences found that only six percent of workers reported receiving skill-improvement training in the basics from any source (not just their employers). The National Organizations Survey (1990–91) found that 16 percent of establishments reported offering training to improve remedial skills to their workers. These are probably the most reliable estimates. Other sources include a 1997 Industry Report done by *Training Magazine* that finds 18 percent of firms with more than 100 employees provide remedial training, and a 1994 American Management Association survey that reported 20 percent of firms offered remedial training.

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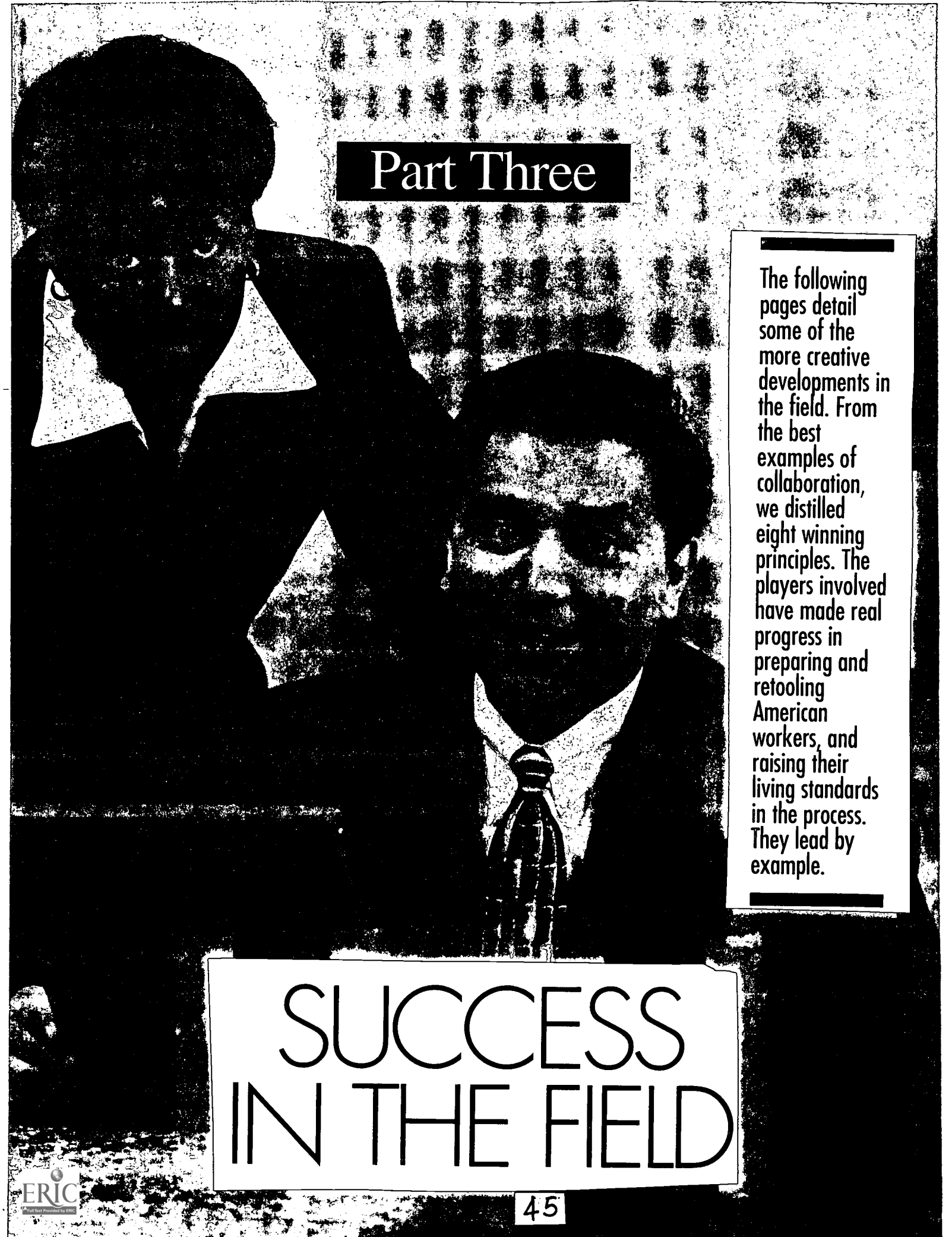

Part Three

The following pages detail some of the more creative developments in the field. From the best examples of collaboration, we distilled eight winning principles. The players involved have made real progress in preparing and retooling American workers, and raising their living standards in the process. They lead by example.

SUCCESS IN THE FIELD

It's not just a matter of a labor market that is competitive. Even those who are available for hire fall far below the hiring needs of employers.

To triumph in this very trying environment, Santa Clara, California-based **Intel Corporation** has pieced together a strategy with schools, government, and workers. Its effort in New Mexico is a leading example of a collaboration at work.

The arrival of Intel's pentium chip plant in the Albuquerque area meant substantial change for the previously quiet community. Its large workforce put new demands on a school district that lacked adequate revenues. To ensure the company's best understanding of New Mexico's priorities, Intel hired Bill Garcia, the State's former Secretary of Economic Development, to help forge a productive relationship with local officials. Garcia was an inspired choice: he had maneuvered well through the state's politics and agencies and had cultivated important relationships with grassroots organizations.

With a tie to the state, the company won a generous financial incentive package in exchange for a commitment to help the region improve its workforce development through partnerships with secondary schools and community colleges. It pledged, in turn, to build a new high school and to hire a minimum of 60 percent of its fast-growing workforce locally. To meet the hiring commitment, the company must beat some tremendous odds: a majority minority population with one of the highest illiteracy rates in the nation and a working population that is, on balance, unskilled. To attract new workers to the plant, Intel offers attractive starting salaries, stock options, bonus plans, education and training opportunities, and more. Intel's urgency and the state's priority has forged important community alliances including the high schools, community colleges, municipal government, and Intel's own management and employees.

PRINCIPLE ONE

No single business, group of workers, educator, or government agency can tackle the training challenge alone.

Intel Corporation: Community Alliances
Boeing Corporation: Training in Schools
Jane Addams Resource Corporation: Sharing Learning Resources
Manufacturing Extension Partnership: Helping Manufacturers Compete

Training in the Schools

Schools that adapt to market needs establish winning relationships with industry. This is seen in the case of the **Boeing Company**, a manufacturer in a cyclical business with a huge backlog of orders, a relatively senior workforce, and serious skill challenges that require immediate attention. The company has partnered with schools in an attempt to push some of its entry-level training — costing hundreds of thousands of dollars — back into the Seattle schools. In conjunction with the federal government and local schools, Boeing has worked an arrangement that refines the curriculum to suit Boeing's needs, although the skills it develops are portable to many other work arenas. The result: Boeing has a ready source of labor, and workers are better prepared for rapid technological change and can expect brighter earnings prospects.

After securing a grant of almost half a million dollars from the **National Science Foundation**, Boeing and other area manufacturers put together an applied academics program with a manufacturing specialty for distribution to local high schools. This tech-prep program feeds

PRINCIPLE ONE

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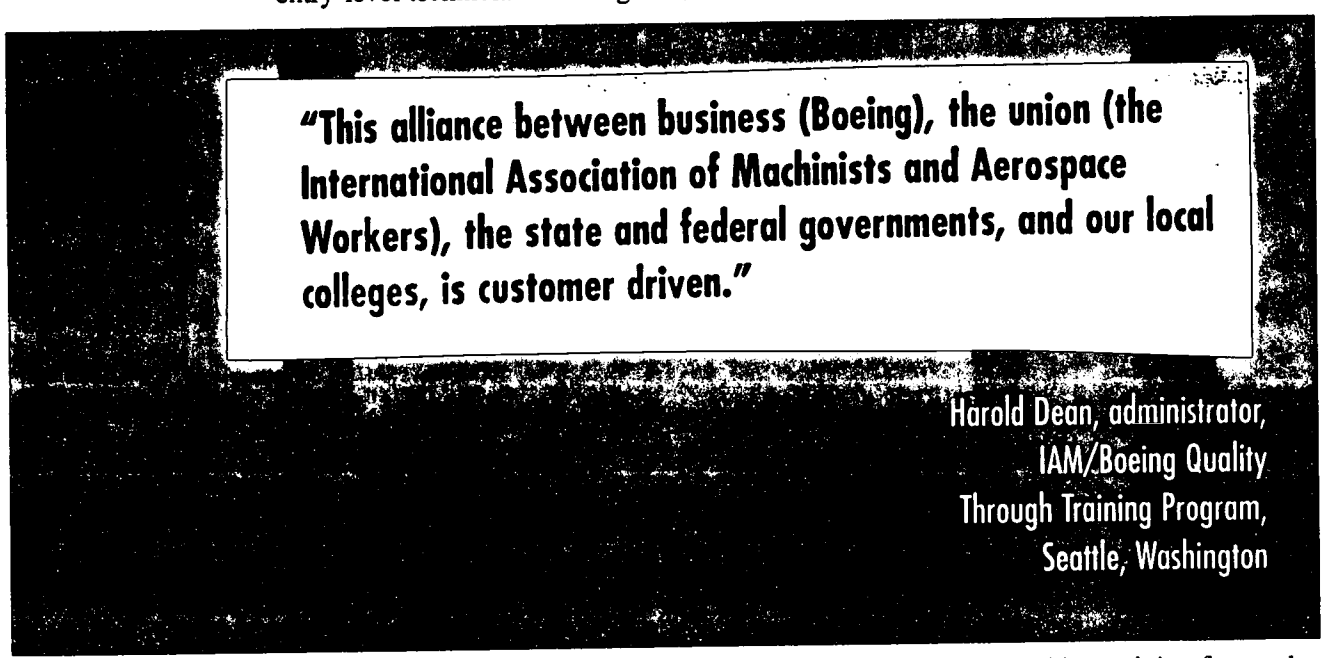
interested high school students into a manufacturing technology associate program at 13 community colleges and five technical colleges.

Students who take manufacturing technology courses in their junior and senior years of high school earn college credit that can be applied towards a two-year associate degree with participating colleges. During the summer before they graduate, selected students do internships at Boeing and other companies that introduce them to career opportunities in manufacturing, teach them basic factory skills, and assist them in selecting specialty fields within manufacturing.

The work pays off: after completing a year or two of community college, students are eligible to work at Boeing as entry-level technicians earning $27,000 a year. And Boeing gets proven workers who are already familiar with manufacturing and are therefore likely to be productive quickly.



Sharing Learning Resources

Not all companies are able or willing to commit the time and investment that Boeing is in Seattle. This is especially true for small firms. Some of the biggest barriers to training are the time and cost of just *researching* learning options. Generally, small and mid-sized companies are not willing do much on their own unless they see an immediate impact on their bottom line. There are ways to share the costs, however, and the best training alliances allow companies to pool their resources and to benefit from economies of scale. Both workers and companies benefit from a broader choice of training opportunities that would likely be unaffordable otherwise.

Not all alliances are company-driven. On the outskirts of Chicago, the **Jane Addams Resource Corporation** (JARC) has managed to create an informal network of collaborators. JARC is a community-based, non-profit training provider that receives funds from the state. Its expertise is in basic skills training for workers in the metal stamping industry. JARC's business clients know that training translates into improved productivity on the shop floor, and they are extremely loyal to the trainers.

In fact, although the firms compete in the same industry, they often collaborate on curriculum design and donate equipment to JARC for training purposes.

Basic shop skills are certainly transferable within the industry, but JARC finds that the companies most generous with their training do not lose employees because those workers are able to transfer to higher positions within their original companies.

Helping Manufacturers Compete

Partnerships can help small manufacturers that are struggling to compete. Because small companies are the foundation of many products sold worldwide, their capacity to produce goods reliably, and at a competitive cost, has direct bearing on the success of the larger companies that they service. And, of course, without that success, the small suppliers that form the backbone of U.S. competitiveness, would not exist.

The **Chicago Manufacturing Center** (CMC), part of the MEP system of centers across the country that help small manufacturers modernize their production capabilities, builds partnerships between local educational institutions and community and economic development groups in the Chicago metropolitan region. Because CMC gets private sector support and assistance from federal, state, and local government, it can offer its services at rates affordable to small companies. Despite the dramatic drop in the region's overall manufacturing employment over the past 15 years, a surprising number of manufacturers in the area must hire new employees for skilled technical positions. Since the average age of the typical manufacturing worker is quite high, many workers are eligible for retirement, opening up new job opportunities.

Some firms need assistance in ensuring the ongoing skill development of their current workforces. For instance, CMC helped **Chicago Metal Rolled Products** develop a companywide learning program that included basic education, job-specific training, and computer skills training.

Like other businesses, the metal company has to accommodate a multilingual workforce: classes are taught in English, Spanish, and Polish. The program has paid off. Since it began, the company has generated 30 percent sales increases, and employment has jumped 20 percent. CMC and its community college partners do joint visits and engagements with clients, bringing a broader array of services than either entity could do alone. It also helps the colleges gain access to and understand how to work with the small manufacturer that is otherwise hard to reach. Together, CMC and the colleges develop education and training programs that are responsive to the unique needs of small employers.

PRINCIPLE TWO

All parties must buy into training for it to be effective; each player must have an up-front stake in designing and instituting continuous learning.

- **US West Communications and the Communication Workers of America:** Working Together
- **Lockheed Martin Control Systems:** Training for New Markets
- **Rockwell Automation's Allen Bradley and the United Electrical, Radio & Machine Workers of America:** Retraining to Keep Jobs at Home

Training for High Performance

It used to be that employees entrusted major decisions affecting their work life to the organizations that employed them. The result was an environment that created a dependent employee. For employees today, responsibility is at a premium, with all levels of workers conscious of the reality that the quality of their work impacts the company's success. Increasing numbers of firms are nurturing employee initiative because they recognize that for workers to feel a stake in the company's success, they must be afforded a greater role in organizational decisions. Training figures prominently in this formula.

Workers are participating in quality circles, flexible teams, and continuous learning. They track company finances, thanks to open-book management, and suggest ways to trim costs. Companies offer employees the chance to enjoy incentives and share in profits if they meet performance standards and corporate goals. Because workers are increasingly responsible for the firm's success, they must advance their skill levels. High-performance workers need to be able to create and apply knowledge, to adapt and be flexible, and to work in teams with people of diverse backgrounds.

The payoff to high-performance restructuring is improvements for all: the company gains improved productivity and greater competitiveness; customers get better service and quality; the empowered workers earn higher wages. A national survey of nearly 1,000 companies finds statistically and substantively significant evidence that high-performance workplace practices produce lower employee turnover, higher productivity, and superior financial performance.[1]

An estimated one-fourth to one-third of U.S. firms have made some kind of high-performance changes.[2] On average, manufacturing firms have implemented more mechanisms for reorganizing work than have non-manufacturing firms.[3]

Research shows that high performance work practices are frequently accompanied by increased training. When addressing education and training, it is critical to balance the employer's interest in performance with the workers' desire to maintain job security and worker employability. Unions typically press for training programs designed not merely to enable workers to do their existing jobs, but to develop skills and abilities needed down the road.

The minority of firms that have embraced high-performance strategies includes **US West Communications**, the largest of the "baby bell" telecommunication companies in terms of geographical area. In an industry that launches new products every six to eight weeks, US West faces stiff competition. The company has already undergone massive downsizing and streamlining efforts, but the 1996 Telecommunications Act brought additional challenges as new competitors threaten to infiltrate US West's territory. The company is under tremendous

PRINCIPLE TWO

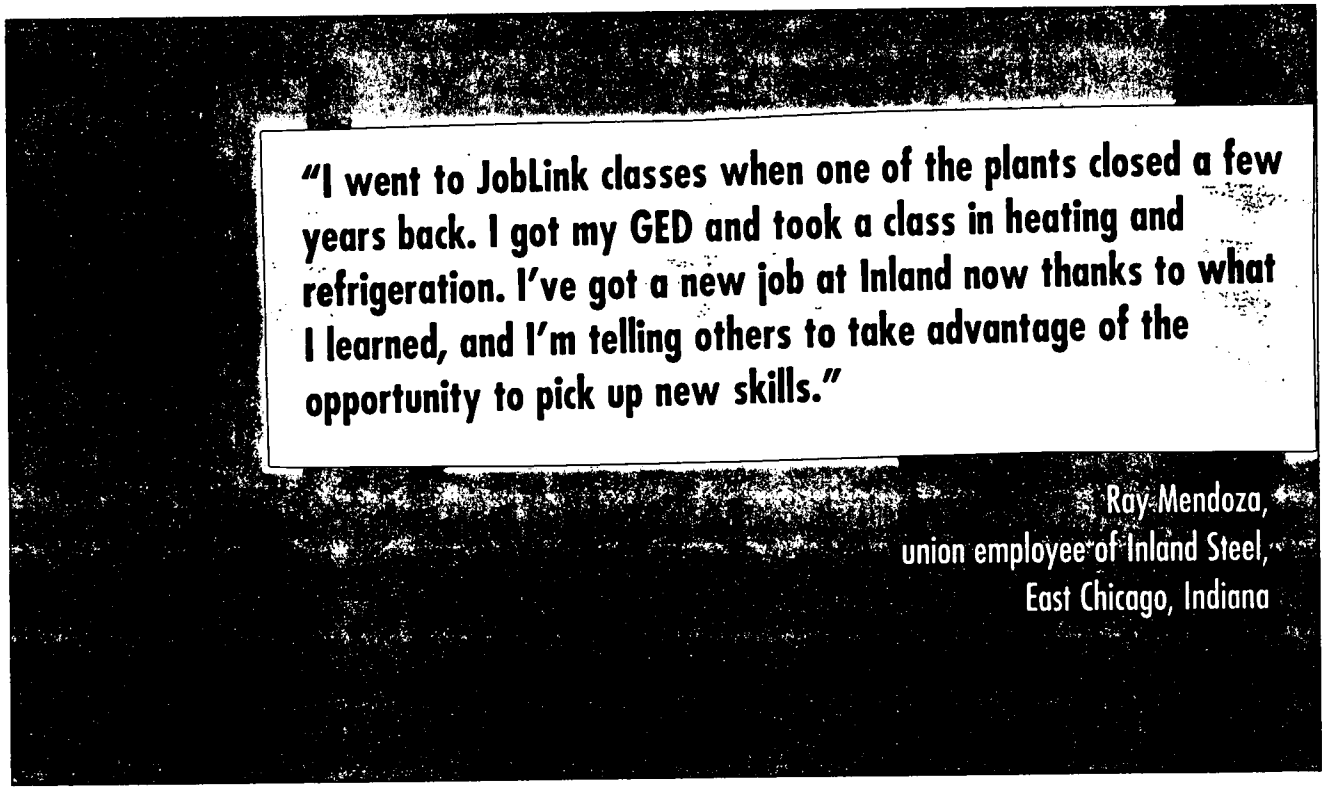
All parties must buy into training for it to be effective; each player must have an up-front stake in designing and instituting continuous learning.

pressure to enhance productivity, lower expenses, increase quality, and boost sales.

Management has had a history of confrontation with the **Communication Workers of America** (CWA). Over the past decade, when it slashed payroll in a time of austerity and downsizing, relations were particularly strained. But in 1996, US West cooperated with the union to establish a new Internet-based training system. A joint management/labor decision-making body was given the task of streamlining the company's operations and increasing productivity. These changes would not have been possible if management had not taken the time to explain to workers the larger competitiveness issues in the telecommunications industry and given workers a role in the restructuring process.

This has been a formidable challenge, given that, typically, labor has spurned technology because it often means the elimination of jobs. But technology can also bring new opportunities to employees (both inside and outside the organization). US West workers were given responsibility for developing the tasks on the new online system — a logical move since the employees are also the end users. Both managers and employees quickly saw that worker feedback not only improved the program, but also gave workers a stake in its success. Additionally, trial runs by the users helped remove most of the bugs before the system was distributed to thousands of other employees.

Managers have been amazed by the improvements in efficiency. Employees now have more time to sell US West services since all the tools they need are at their fingertips on the company Intranet. Because it is easy to make content changes, the Intranet acts as a simple and consistent communications medium for employees. The company is ahead of the curve in web-based training, one of only a handful of large companies that makes all training accessible on the web.



In this case, US West and CWA shared the responsibility for learning. Only when employer and employee have a stake in the results can companies bank on improved performance and employees acquire the necessary skills to advance in the labor market.

Training for New Markets

One of several top contractors for the Pentagon, **Lockheed Martin Control Systems** watched its sales plummet after the end of the Cold War. Both management and the 1,000 rank and file felt vulnerable, but the firm turned a downturn into a new business dimension. By the mid 1990s, this Johnson City, New York-based division of what has become the world's largest aerospace firm moved aggressively into commercial markets. Its goal was to integrate its knowledge of controls and other high-tech electronics, once geared toward military purposes in the air, into civilian use on the ground.

Early on, David Bessey, a management engineer with the company, recognized that Control System's conversion from defense to commercial markets would eventually pick up the slack caused by the downturn in military spending. When government contracting seemed in an irreversible slide, Bessey and his fellow engineers pushed upper management to build locomotive systems in plants that once churned out aerospace defense products. At first, they hit a brick wall: Control Systems built aircraft, and aircraft only, said company superiors. But soon the naysayers saw the potential of winning multi-million dollar contracts, and the firm began to apply defense-related electronic technology to new products. It designed hybrid taxis and buses, locomotive electronics, emissions and noise control systems, and electric cars. Within three years, 44 percent of its sales were commercial, compared with only five percent in 1991.

Bessey, involved in one of the company's most promising ventures, became a shining example of how other companies could make necessary conversions. He has been crisscrossing the country, leading seminars and networking with colleagues in the field who want to emulate Control System's success. Perhaps most exemplary in the Control Systems story is how Bessey and his coworkers have persuaded state and federal governments to help fund their project that brought new opportunities to would-be displaced workers.

The federal government saw the firm as a pioneer in efforts to convert its product for the commercial market and to protect the jobs of its employees. In 1995, the Federal Defense Diversification Program made the Control Systems group one of its 17 grantees by helping to pay for an intensive retraining program. That year it awarded Control Systems a $315,000 grant; in 1996 it made another $622,000 grant.[4] All told, the money helped to upgrade the commercial skills of some 450 employees whose jobs were in jeopardy. For the workers, the funds helped them retrain for new jobs. For the firm, it helped to create a future business opportunity: Lockheed Martin, the world's biggest defense conglomerate, may soon supply Amtrak with high-speed rail equipment

If the federal government played a vital role in Control Systems' earlier incarnation, with a steady demand for the defense firm's products, its endorsement of Control System's commercial transformation was essential to "converting" the workforce. But the linchpin in the company's ability was the buy-in of the workers who watched the downsizing of the aerospace industry and feared layoffs or closure of the manufacturing facility. Although they had to take a pay cut (the company had to bring wages in line with the private market), the workers were able to avoid being displaced altogether, and

PRINCIPLE TWO

2

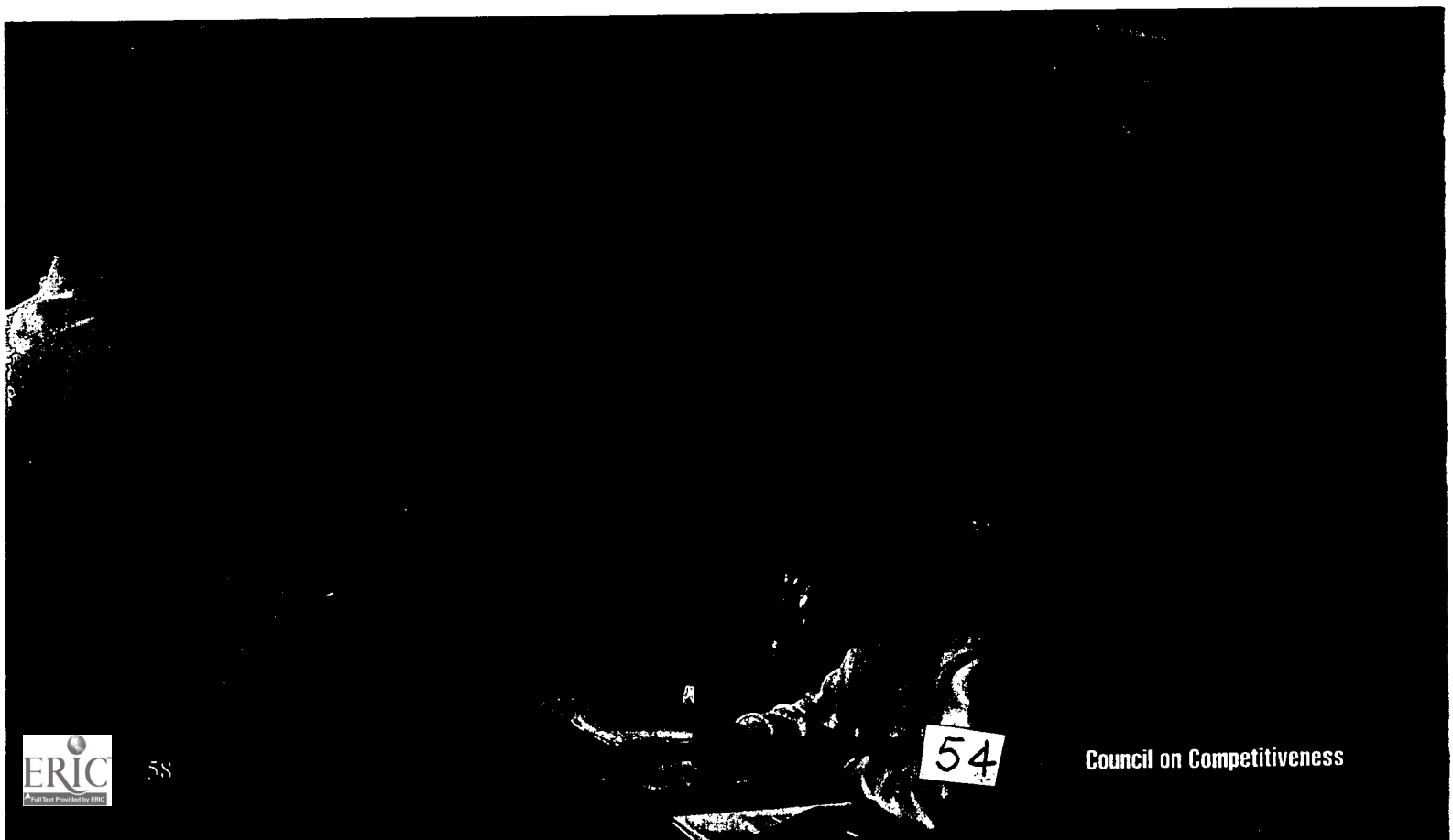
they gained new opportunities to learn marketable skills. Today the plant is well on its way to being profitable. Its training program, considered exemplary by other firms in its field, is perhaps the most widely discussed case study in the industry.

Retraining to Keep Jobs at Home

When management and workers collaborate to define the skill sets needed in the future, they design a more effective training system and heighten the value of learning. California-based **Rockwell International**, with operations in almost 80 countries, is constantly reassessing how and where it manufactures. Its largest automation division is Milwaukee-based **Allen-Bradley**, which designs, manufactures, and supports a broad range of products including logic processors, power and motions control devices, sensors, and software.

As this $4 billion automation unit struggles to determine where best to produce its products, it often comes head-to-head with its union, the **United Electrical, Radio & Machine Workers of America**. Logically, the union has an interest in retaining in Milwaukee those positions that increase skill development, reward greater responsibility, and provide enhanced career opportunities for incumbent workers.

A few years ago, Allen-Bradley agreed not to outsource certain high-skill, high-wage jobs if the union would submit to qualification tests to determine which workers were eligible for the jobs. The company and union pooled efforts to determine how to better prepare workers for advanced positions within the company. Management agreed to keep the test results confidential, allowing those who failed to re-take the test. Employees responded to testing demands because they saw that by doing so, they were helping to keep valuable jobs in Milwaukee, rather than at one of Rockwell's non-union facilities.



PRINCIPLE THREE

Effective training requires that all parties do their part: employers must provide learning opportunities; workers must devote the time and energy to learning; schools must teach marketable skills.

- **Wisconsin Regional Training Partnership:** High Wages and Profits for All
- **Inland Steel Corporation and the United Steel Workers:** After-Hours Learning
- **Pennsylvania College of Technology and Toyota:** A Ready Pool of Mechanics
- **Albuquerque Technical Vocational Institute:** Health Care Training for the Low-Skilled

High-Performance Work

The Wisconsin Regional Training Partnership (WRTP) is a jointly governed consortium established by business and labor leaders in support of high-performance workplaces and jobs with growth. Five unions — the United Auto Workers, the International Association of Machinists, the United Steelworkers of America, the United Electrical Workers, and the United Paperwork's International Union — and two dozen firms concentrated primarily in metalworking, electronics, and related durable goods industries, participate in the consortia. The Executive Committee is composed of an equal number of management and labor representatives and a smaller number of public sector representatives, including the state's labor secretary, and the directors of the area technical colleges and private industry councils.

The WRTP emerged out of the manufacturing sector's massive restructuring during the 1980s, when the job base shifted to the low-wage service industry. An unfortunate consequence has been a sharp reduction in living standards, given that service jobs pay about one-third less, on average, than manufacturing jobs.

The survival of those manufacturers that remain depends on their ability to acquire new technologies, develop new ways to organize work to spread responsibility and elicit employee participation, and draw on a skilled workforce.

In response, those employers formed WRTP to define job performance standards and the training necessary to ensure skill development. Management agreed to provide learning opportunities with the condition that labor would share the responsibility for improving performance. The local Waukesha County Technical College is helping to reconfigure the manufacturing education and training system so that training is easily accessible, offered at flexible hours, and is as individualized as possible. It's a worker-centered approach that more educators are using as they refine their own skills in providing workplace education and training.

External resources from state government and national foundations were critical during the start-up phase. Now, the WRTP is self-sufficient through local funding from training and modernization service providers. They have an interest in investing since WRTP boosts demand for increasingly sophisticated services and helps them achieve their missions. And member companies are taking an interest in training. Workers have increased their training hours and hiring is on the rise. State and local officials have also called upon the WRTP to troubleshoot problems that are common to employers across the state.

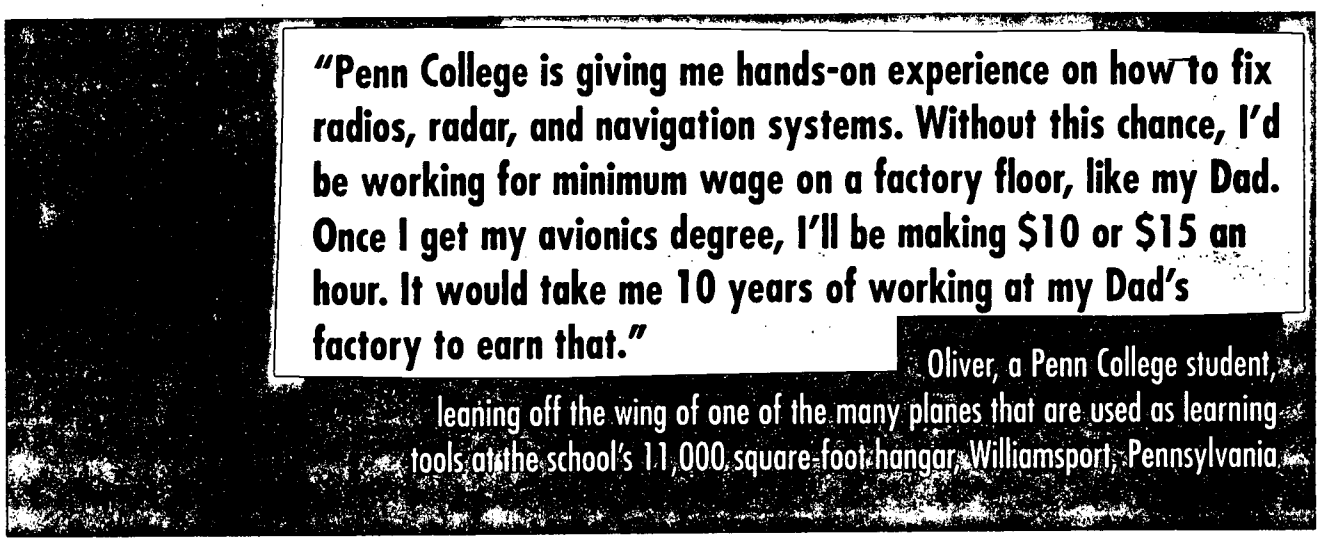
After-Hours Learning

Training doesn't just mean lecturing to workers or formal classroom instruction. Self-directed learning is fast becoming the most effective way to boost skills and incomes.

PRINCIPLE THREE

Effective training requires that all parties do their part: employers must provide learning opportunities; workers must devote the time and energy to learning; schools must teach marketable skills.

At East Chicago, Indiana-based **Inland Steel Corporation**, many workers are acutely aware of how important this is. In the mid 1980s, Inland Steel began a volatile period of massive restructuring and layoffs. Downsizing, and all the worker anxiety that accompanies it, continues today. Not knowing what the future held for Inland or the industry, management wanted to give the workers a chance to expand their skills and knowledge on their own time. So **United Steel Workers Local #1010** prodded the company to set up a workplace skills program to better cushion workers from a hard fall. The result is JobLink 2000.



Although Inland funds JobLink 2000, the workers are responsible for registering for and committing time for the classes. Taught by instructors provided by a local suburban college, employees often take functional home-improvement classes in anticipation of future employment options at the company or outside. The workers are always wary of where they will be in the next corporate restructuring, and they are anxious to have income possibilities during their retirement. Some use the courses to start their own plumbing businesses, others pick up home repair skills as a hobby, others pursue employability in other departments of Inland Steel. Whether the classes are in wiring, masonry, computers, or small engine repair, they all incorporate basic skills. Carpentry math, for instance, involves working with word problems, reading a tape measure, reducing and computing fractions, and using a calculator. The company institutes pre- and post-tests to capture the results. After a Residential Wiring and Carpentry class, for example, some workers saw their math scores improve by as much as 1,900 percent! JobLink 2000 pushes workers to gain new portable skills and provides the company with performance improvements.

Market-Responsive Schools

As the demand for continuing education expands into the workplace, higher education institutions are tapping into a lucrative market. **Pennsylvania College of Technology**, a wholly owned affiliate of Penn State University, is flourishing in Williamsport, a small community in northern Pennsylvania. Despite its remote, rural location, Penn College has secured strong partnerships with some of the world's major industries. Companies are so convinced of the school's ability to train workers, they are willing to donate major technical support, hardware,

software, and other training materials to Penn College for general learning purposes.

The United States-based manufacturing arm of **Toyota**, for instance, developed automotive classrooms at Penn College to enhance the school's transportation technology program. Since 1990, Toyota has been sending its employees to Penn College to learn the latest techniques. For the past seven years, Toyota has donated training aids, curriculum, and vehicles for the students to learn from firsthand. A simulated electrical system from a Toyota Camry is available for students to troubleshoot and repair problems. Given the technological advancements of automakers, repair work is central to a manufacturer's competitiveness. The investments in training are very worthwhile, say Toyota officials. Although the program's start-up costs totaled $300,000, the firm figures it made up the costs in the first year and can rely on the Williamsport school to churn out a ready pool of mechanics. The hands-on training pays off for students, who move easily into jobs after graduation.

The market responsiveness of schools is proving critical to local economies. Albuquerque's **Technical Vocational Institute** (TVI), already New Mexico's largest community college, is creating new business for itself with tailor-made programs for high-growth industries.

Those industries are desperate for workers in a state in which welfare dependency, high-school drop out rates, and illiteracy are way above the national average. The fast-expanding health care services, including New Mexico's hospitals and HMOs, are in a constant search for a wide variety of technicians. TVI is intent on turning out enough respiratory therapists to meet the growing demand. And the school is targeting a virtually untapped market for retraining: the unskilled and minimum wage workers stuck in dead-end jobs. It's a logical match: enrollment is open; tuition for general classes is inexpensive; classes are held at all hours; counselors are on hand to provide support services; and market demand for health care services will rise as the population ages.

With 100 percent placement rate of its respiratory therapy graduates, for example, TVI has engendered confidence and support from local business. In fact, the private sector has donated much of the lab's $100,000 worth of capital equipment, including state-of-the-art computerized systems that simulate respiratory failure. The clinical simulations help students refine their critical thinking and decision-making skills in life threatening situations. The American Heart Association produced a software package that allows students to receive nationally recognized certificates in basic life support and advanced cardiac life support without leaving the computer lab.

Strides made at Penn College in Williamsport and at TVI in Albuquerque, enabled in part by the support of government and private industry, create new skills and income opportunities for a whole new generation of workers.

8
9

PRINCIPLE FOUR

Education and training are not ends unto themselves; rather, they are essential means for creating worker employability, upward mobility, skills portability, and firm productivity.

- **DeAnza College's Occupational Training Institute:** Matching Trainees with Jobs
- **Valencia Community College:** Tracking Graduate Success
- **Michigan State's Human Resources Development, Inc.:** Emphasizing Employability
- **Lansing Area Manufacturing Partnership:** Opening Up Apprenticeships to Youth
- **Laborers International Union of North America:** Giving Students an Eye into the Industry

At **DeAnza College's Occupational Training Institute** (OTI) in Cupertino, California, education and training are seen as steps toward employment. OTI is designed to help dislocated workers and the economically disadvantaged enter (or re-enter) the workforce. These non-traditional students will only pursue education and training that promises to pay off in increased skills, new opportunities, and/or higher wages. To help motivate students to stay in school, OTI offers a wide range of employment-related services such as career advisors, study skills workshops, and job search training. Both before and during enrollment at DeAnza, OTI counselors help students make the vital connection between education and opportunities in the labor market.

OTI puts a priority on maintaining close relationships with major employers in the Santa Clara Valley region, and it frequently reviews those relationships to ensure that training programs meet the needs of the local market. Roughly 85 percent of OTI clients find employment after completion of training, with 75 percent moving into their chosen field.

Tracking Graduate Success

States are moving to simplify and consolidate workforce programs — ranging from training to job placement to welfare. This provides employers and workers ready access. Employers want a system that is easy to use and provides qualified job candidates. Job seekers need timely and reliable information about job openings and skill requirements. These new systems, governed by "workforce development boards," provide a host of services, but priority is generally on job search, counseling, and related assistance. Programs are increasingly being judged by how well they place participants.

Working on behalf of the broad central portion of the state, Florida's **Valencia Community College** has been bolder and more successful than its counterparts across the country in designing education/vocational programs that connect their participants directly to the jobs. The college entrusts the issue to an initiator. Susan Kelley, vice president of resource development and government relations, has determined from the outset that Valencia must lead the way in eliminating the overlap among and between federal and state agencies. Valencia was just one of many public and private sector partners in a five-county area in central Florida that designed a new customer-driven workforce education and employment system. The partners successfully consolidated activities of the Job Training Partnership Act (JTPA), one-stop career centers, and community colleges. The federal government sees this as a model that can be replicated around the country. Kelley has taken Valencia's success beyond the school's Orange County base. She pushes for statewide change and holds her school as an example. Through Kelley's public

PRINCIPLE FOUR

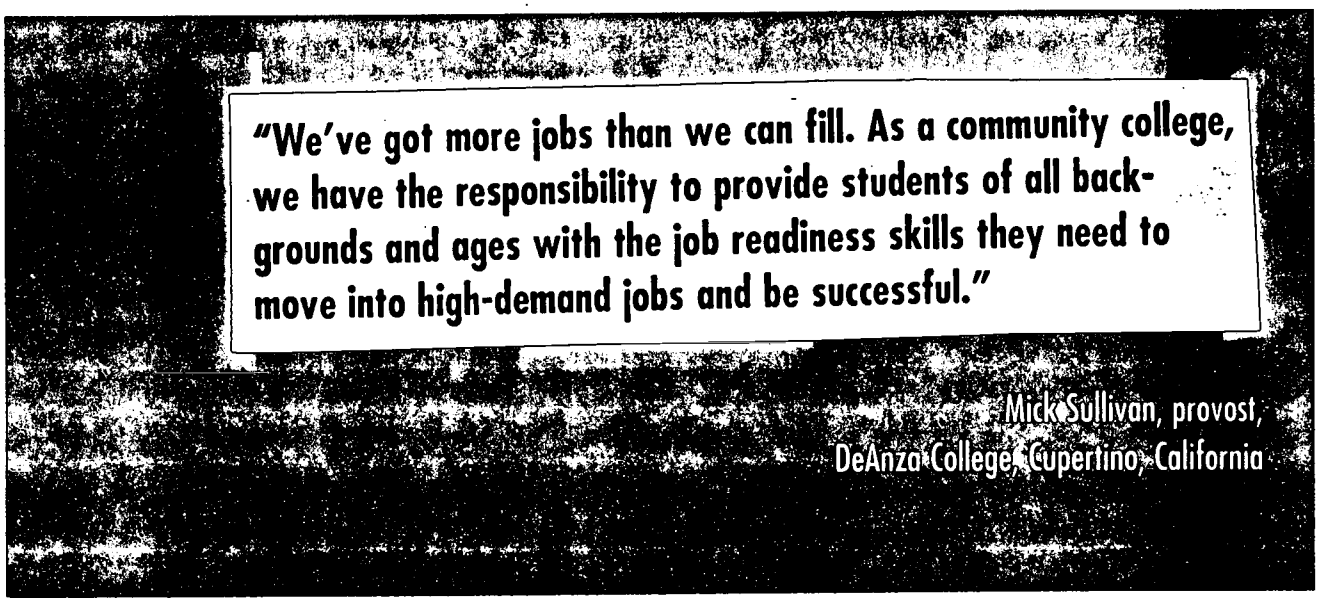
Education and training are not ends unto themselves; rather, they are essential means for creating worker employability, upward mobility, skills portability, and firm productivity.

efforts and tireless networking, she is nationally recognized and called on to share Valencia's strategies with colleagues across the country.

Community colleges in Florida and other states are beginning to survey employers on their skill needs and to track job placements of their graduates. To enhance the competition, the state publishes data from each participating college regarding its graduates' wage rates and job retention. This allows interested students to compare Valencia's results, for example, with other colleges and public schools. And it makes it easier for employers to locate training opportunities for their workforces.

Emphasizing Employability

Today's workers are taking more of an interest in their own learning, knowing that employability is key to their workplace success. In a heavily unionized state in which the economy has undergone dramatic changes, **Michigan State's Human Resources Development, Inc.** (HRDI) exemplifies how organized labor can be instrumental in developing innovative ways to boost workers' skills. Michigan HRDI serves many clients by providing technical assistance on employment and training issues to labor, industry, and public sector agencies. Aligning with employers that need workers, the non-profit organization ensures that in the education and training process, employment is the final result.



Obviously, such responsiveness is a great multiplier for economic development. Companies can bank on expansion because they can dip into an adequate and ready pool of trained/trainable workers; students can expect to find jobs that match their skills; government can streamline and pare down costly programs — from outplacement centers to welfare coverage.

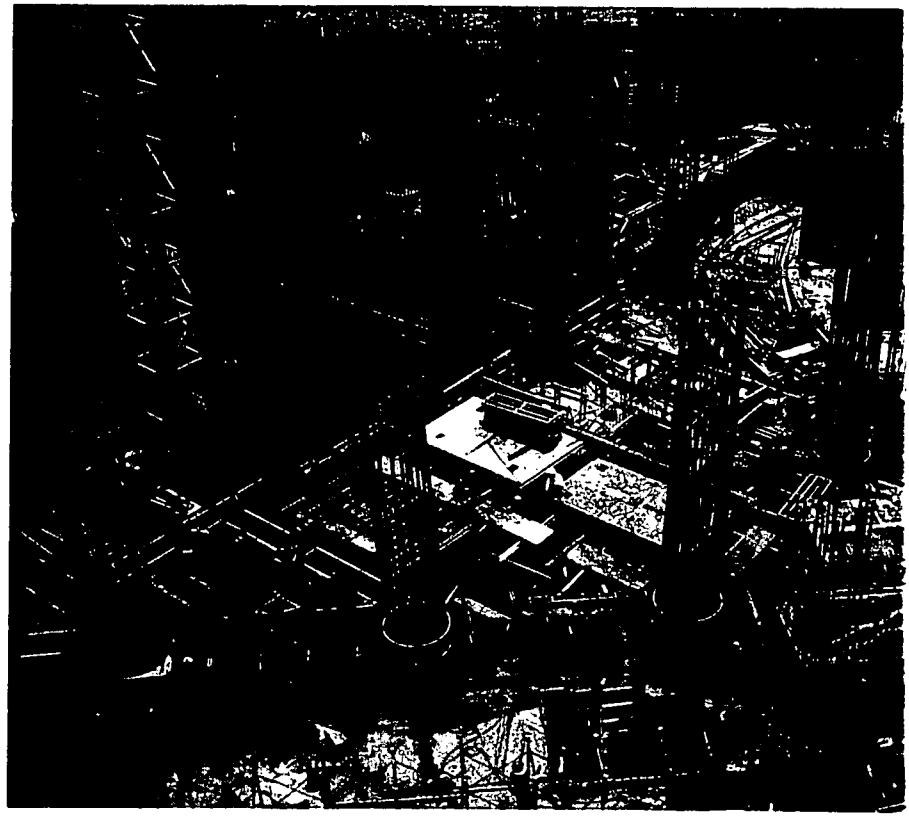
Written off a decade ago as a Rust Belt state, Michigan has in recent years hit record highs in jobs created and new lows in unemployment. The gyrations in market demand have created new challenges in workforce preparation. If the 1980s were the days of painful downsizing for General Motors (GM), Ford, and Chrysler, now the Big Three are trying to squeeze all the available production capacity out of existing plants. After exhausting layoff lists and the jobs bank,

the three automakers are now faced with overwhelming recruitment, screening, hiring, and training challenges. The Big Three estimate that between 1995 and 2003 nearly one-half of their hourly workers may need to be replaced as some 260,000 skilled workers enter or are eligible for retirement. Even though the companies offer generous pay and benefit packages — the average Big Three employee earns $43 an hour in total compensation — this will be a struggle.

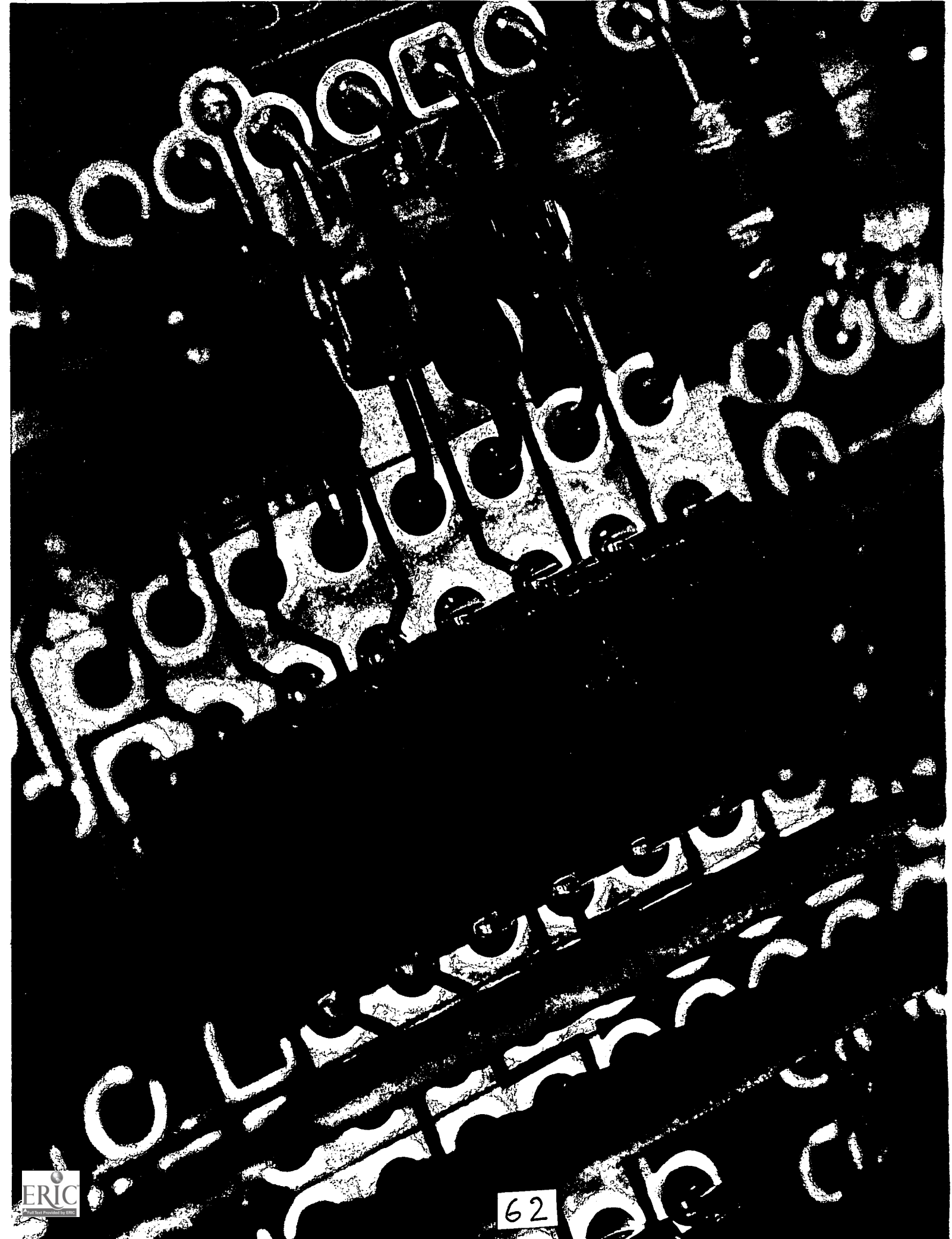
Anticipating this hiring boom, labor is taking action by developing school-to-work programs that introduce automotive careers to high school students. For example, the **Lansing Area Manufacturing Partnership** (LAMP) is a school-to-work program in which students learn about production-level union jobs through work-based learning experiences on the floor of GM plants in the Lansing area. To ensure that the union was fully involved, GM largely turned over to the United Auto Workers (UAW) responsibility for developing the curricula with a vocational-technical center that serves 12–13 local school districts in the Lansing area. GM and UAW see this as a national model that will be replicated.

The unions are also devising "school-to-registered apprenticeship" programs. A new law on the books has sparked interest in registering high school students as apprentices. The Michigan State Legislature passed a $2,000 tax credit for businesses that take on a registered apprentice (union or non-union). The $2,000 can help firms cover such costs as wages or training tools for apprentices, and many firms are taking advantage of this incentive.

The unions recognize that the lack of qualified entry-level workers is hurting their ranks. In particular, one of the construction industry unions, the **Laborers International Union of North America**, is hoping that by giving students an early look at the trade and the benefits of being unionized, it will later be able to recruit students into the union. That union is one of the players involved with giving students in Lansing and Detroit the opportunity to participate in work-based learning experiences, along with the state's Bureau of Apprenticeship Training, the Michigan Department of Education, and the Michigan Jobs Commission. The union loaned work space to the students, even though the students are not required to join the union to participate.



The apprentices-in-training work full-time over the summer before their senior year of high school and part-time during their senior year. They return to full-time work after graduation, while they also pursue a post-secondary degree at a nearby community college. The work hours count toward the required 6,000 or 8,000 hours of training time they have to log to become state-registered apprentices.



PRINCIPLE FIVE

Learning helps accomplish worksite goals when it is convenient and available in smaller, more targeted increments.

- **Stevens Institute of Technology's Advanced Telecommunications Institute and Bell Atlantic:** Learning Online
- **Boeing Company:** Just-in-Time Training
- **Disney University:** Training as Teams
- **Xerox Corporation and the Institute for Research on Learning:** Integration of Learning and Work
- **DeAnza College:** Degrees in High Demand
- **Western Governors University:** Convenience Education

Across the Hudson River from New York City, **Stevens Institute of Technology** has put together a very effective coalition. The Hoboken, New Jersey-based institution is one of the country's oldest private technical colleges and one of the best examples of how a university can become a vibrant contributor to workforce development. Stevens' **Advanced Telecommunications Institute** (ATI) operates with funding from government and industry. Supported by the Bell Atlantic and Transwitch corporations, ATI is a highly developed laboratory to research the latest telecommunication technologies. It breaks down into three components: research and development; technology transfer from the college laboratory to industrial circles; and educational programs, from short-term technical courses to promote staff development to full master's and doctoral programs.

Students at the Stevens Institute are helping **Bell Atlantic** to use technology as a workplace learning tool. By developing an online, multimedia course that company electricians can access remotely from any web server, workers don't have to leave their work to attend class at another location. The company saves time and travel expenses. Technicians and engineers who are often on the road benefit from just-in-time learning that can be dialed up from any desktop computer. Highly visual lessons, replete with easy-to-follow graphics, on how to do new service installations, for example, can be learned at the very place where the installation is needed. Workers can simply use the online support as a reference. And other online classes help keep them up to speed on the latest developments in the industry, yet they do not require users to take in all the information at once.

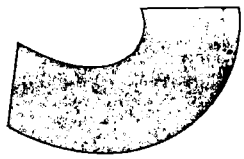
Learning Just-in-Time and at Work

Although corporate universities abound, there is a clear trend away from subject-driven, off-site, classroom-style training and toward job-specific, on-site, just-in-time training. It is getting harder to sell training in the traditional two- or three-day seminar format because the compression of time mandates that learning be convenient and customized. Increasingly, employees who need job-related information will pull up online repositories and extract the appropriate data. At the **Boeing Company**, factory workers already consult such brief videos for instant illustrations of many tasks involved in building airplanes. Computer-based learning breaks down traditional courses into learning "nuggets," giving the learner just what he or she needs to perform and just when it's needed.

Other organizations are training their employees in their normal work teams to ensure that lessons learned can be applied immediately. The informal interaction between workers often reinforces learning and is more likely to result in performance improvements. A few years ago, **Disney University** realized that too many

PRINCIPLE FIVE

Learning helps accomplish work-site goals when it is convenient and available in smaller, more targeted increments.



employees were not retaining and applying the skills they learned during training. The trainers concluded that too much of the learning took place in classrooms far away from the actual work site. So training was restructured and now focuses on helping an entire work team learn as one unit, on-site. In addition to job-related training, Disney's performance consultants offer courses in the important social dimension of work effectiveness: conflict resolution, listening skills, and other interventions designed to help work units operate smoothly.

"More and more, industry-led curricula are determining the kinds of technical degrees people are earning. Community colleges have been pretty quick to adapt, and they are learning how to accommodate industry needs. We've worked to shorten programs, and we're looking for new ways to change curricula."

Bill Garcia,
public affairs manager,
Intel Corporation,
Rio Rancho, New Mexico

The Institute for Research on Learning (IRL) specializes in understanding how people learn and designing strategies and practices for effective learning. Founded in 1987 as a national non-profit center by Xerox, IRL recently helped **Xerox** to rethink its training practices for the company's customer service center in Lewisville, Texas. The customer service representatives were frustrated that they didn't have the knowledge they needed to meet customer needs. For years, the company had relied on old systems of customer profiles that segregated customer service, billing, and account inquiry and phone support. Integrating the three departments into a single unit would require the staff to learn multiple jobs.

With the help of IRL, *phased interactive learning* was introduced in September 1996, allowing workers to learn in a communal environment and to apply training as they progressed. Instead of undergoing weeks of training on how to answer customer calls, representatives were taught the basics in a classroom and then allowed to start taking real calls to get a feel for the job. Workers were given a chance to apply lessons, coach peers, and interact in the real workplace setting, which minimized time away from work and encouraged a supportive social structure. By fostering the proper work environment and by leveraging the learning that naturally takes place in small work groups, the company improved work processes and boosted morale at the same time. In addition, millions in recurring

savings were documented as customer and employee satisfaction increased.

Degrees in High Demand

Just-in-time also means that schools and vendors are shortening their classes, making them more flexible and task-specific. **DeAnza College** in Silicon Valley offers a medical technician program that has minimal entry requirements and is designed to place graduates quickly into positions in the health industry. Instead of having to attend school for two years to earn an associate degree, students can be certified in just one year.

DeAnza designed the curricula in 1990 in response to growing private sector demand for trained workers, and the college is successfully turning welfare recipients and dislocated workers into employable workers. Enrollment immediately jumped 300–400 percent when the "time to degree" was shortened. But employers need workers so quickly that they cannot afford to wait one year. Now DeAnza is under more pressure to make the learning time shorter and to offer mini-certificates that can be earned in just one-quarter's worth of classes and work experience (12 weeks total).

The ultimate in convenience education is the newly developed virtual **Western Governors University** (WGU). Like other learning institutions hoping to attract a host of diverse learners, WGU is making learning available "anytime, anywhere," and offers many options. Bypassing traditional classrooms, WGU uses advanced technology to expand educational opportunities to reach a wider array of students using courses from multiple institutions. WGU is not expected to supplant the traditional campus setting; rather, it has set its sights on the would-be students wishing to return to school and those disenfranchised from the higher education system. WGU is breaking new ground by requiring students to demonstrate competencies — not to log seat time — to earn a WGU certificate or degree. *Where* learning takes place will no longer be as important as *what* a student actually learns.

Courses will be available through various media, including CD-ROMs, the Internet, interactive video, e-mail, satellite, and 500 television channels. An Internet-based catalog will not just list various courses. The catalog is designed to help students assess their existing skills and knowledge and determine what courses they need and are prepared to take.

PRINCIPLE SIX

Technology-based learning can improve accessibility and reduce cost, but it is not a complete training strategy by itself.

- **IBM:** Connecting Employees
- **Sun Microsystems:** Classroom Training Fills a Need
- **Hewlett-Packard and Stanford University:** Interactive Classes
- **National Technological University:** Distance Learning That Hits Home
- **Maricopa Community College:** Degrees on the Net
- **Pacific Gas & Electric's Technical Learning Services:** Simulated Drills
- **Andersen Consulting and the Institute for the Learning Sciences:** Multimedia Self-Study
- **U.S. Robotics:** Making Computers Fun
- **Dartmouth College's Amos Tuck School:** Wired: A Competitive Edge

The development of interactive technologies is transforming the way workers learn and how companies do business. The percentage of people currently using information technology directly in their jobs has tripled since 1970.[6] And more and more firms are using computers to deliver education and training. No longer are annual seminars and training sessions the only means for employees to improve their skills. Instructional technologies that emphasize group work, problem solving, and collaboration are increasingly available. Simulations, while costly, are often the ultimate tool.

Many companies see technology solutions as less expensive and more effective than traditional ways of providing learning. For firms with workers scattered across time zones, technology is an ideal way to reduce costs. Flexible delivery choices expand the reach of training beyond costly training facilities, which require workers to travel and lose work time. Distance learning options reduce the cost of instructor and student travel, while broadening access for many other workers who may not otherwise be able to participate. Technology brings learning to the desktop or workstation so that it is available when and where employees need it.

However, technology solutions are not a natural fit for all work-site training. Classrooms provide invaluable interaction, teamwork, and remediation opportunities that neither firms nor schools are willing to part with. At least not yet.

Integrating Technology

The now commonplace computer has changed the way organizations operate; nearly 60 percent of employed workers under the age of 50 already use a computer at work — and usage continues to grow. The indirect, but rising costs of training, such as travel and off-site classes, are pushing companies to make training accessible from the desktop and integrated with work. Naturally, this relies on a computer-literate workforce and puts even greater pressure on firms to bring workers up to technological speed.

More and more companies like **IBM** are vigorously pursuing ways to bring learning to the personal workspace. In the United States, about 55 percent of IBM employees are "teleworking" in some way — working from customer locations, home, or elsewhere during some part of the working week. That makes the smart, timely use of technology even more important in the effective delivery of skill development and continuous learning opportunities. Employees take responsibility for their own employability, and IBM provides the supporting tools and resources.

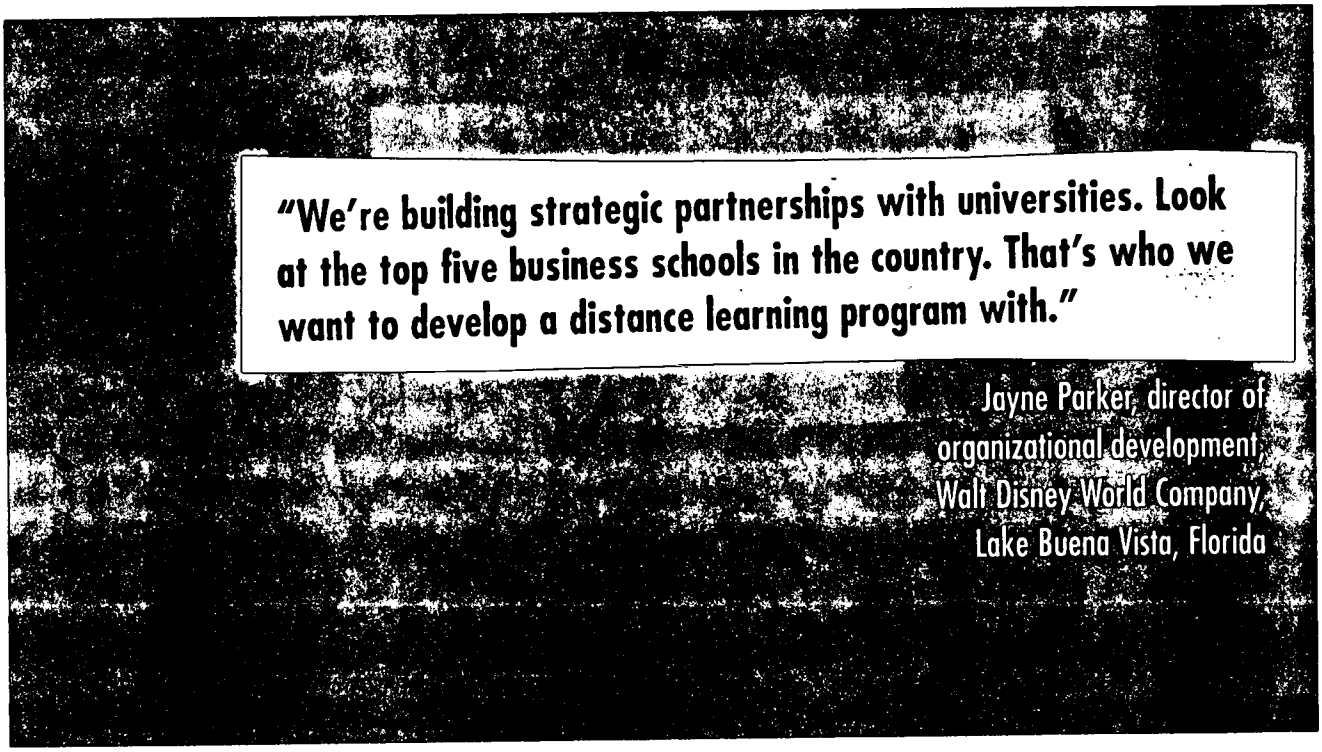
The company estimates that three-quarters of its training budget goes to

PRINCIPLE SIX

Technology-based learning can improve accessibility and reduce cost, but it is not a complete training strategy by itself.

cover employee travel time and lost work hours alone. It can no longer afford to send its far-flung employees to training when learning can be brought to the desktop. An audio-enabled computer with web browser is the key tool, because learning via computer reduces costs associated with instructor/student travel; puts instructor expertise to better use; and allows teams of workers to collaborate, compare, and enhance their own performance. For employees seeking career counseling, self-assessment tools, and other professional development workshops, the company has devised a National Career Fitness Intranet website that is available to all its workers, anytime and anywhere.

IBM's subsidiary, Lotus Development Corporation, developed "Learning Space," a complete technology solution that combines the benefits of distance learning with the collaborative advantages of a traditional classroom. Classes still have instructors and regular assignments, but interactive discussion databases allow students and teachers to share information, work in teams, and ask and answer questions. A traditional class that takes five days might be extended over 20 days time, making it easier for workers to join training at their convenience. Additionally, because LearningSpace is based in Lotus Notes, which is an integrated software package being rolled out companywide at IBM, learning will also be available on demand for all employees at the click of a button. Tutorials and quick help boxes give just-in-time hints to workers, regardless of whether they are enrolled in any formal online classes.



By 1998, IBM plans to have 40 percent of its training in the United States be technology-based.

Sun Microsystems, which has developed many of the core networking technologies at the heart of the Internet, sees web-based learning as a way to augment, not replace, classroom learning. Sun uses technology to cover basic material, but

its employees still logged 20,000 instructional classroom hours in 1996. It is particularly striking that Sun, one of the most advanced technology firms in the country, believes that classes offer an invaluable human factor that technology cannot provide.

Technology Options

Technology has the potential to bring training closer to the user and can be very valuable in certain circumstances. Learners like it because it offers greater convenience, immediate feedback, and the opportunity to determine their own pace. Organizations like it because it reduces learning time, provides a consistent model, and is easy to update. Technology comes in many forms, each with advantages and drawbacks:

Computer-based Training (CBT) has been around the longest and is used for some applications by roughly a third of U.S. organizations with more than 100 employees, according to *Training Magazine's* 1997 *Industry Report.*[7] CBT is essentially one method of presenting training, using information drawn from a hard drive, laser disc, or CD-ROM. Computer-based lessons often help users learn faster and remember *more* compared to instructor-led training. In particular, the use of CD-ROMs as a delivery platform for CBT has increased.[8] CD-ROMs can incorporate large media files without fear of network bottlenecks, but the drawback is that course content becomes obsolete quickly and cannot be updated. And many firms find that CBT is not adequately customized to company needs. Often organizations have no choice but to buy off-the-shelf versions because they are unwilling to pay the high development costs of customizing in-house.

Distance Learning is a delivery method that allows learners to "attend class" at locations remote from the point of instruction using a variety of media (including computer, audio, and video). Distance learning is popular because it provides students with access to the most skilled teachers in the world. But it does require a large number of people to be cost-effective, and the up-front investment makes it unaffordable for most firms.

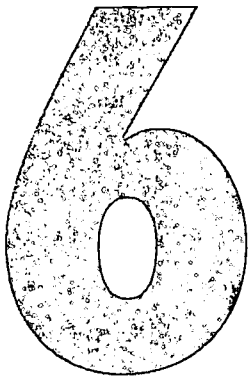
Palo Alto, California-based **Hewlett-Packard** has found a low-tech way to provide distance education. To maintain the most cutting-edge workforce possible, the company encourages its employees to pursue further study at the post-graduate level by making **Stanford University's** engineering and computer science classes available on-site and at no cost. For the Palo Alto-based workers, courses are provided via a television network.

When Hewlett-Packard moved its microwave division to Santa Rosa, California, north of San Francisco in 1972, the new site was out of television range. Stanford agreed to videotape the lectures and to send them to Santa Rosa. For each class, a full-time Hewlett-Packard engineer was chosen (and approved by Stanford) to be course facilitator. The facilitator is responsible for leading the students in discussion for and ensuring that the class works as a group.

Stanford's Dean of Engineering saw this new mode of teaching as an opportunity to set up an educational experiment comparing the effectiveness of attending class, watching via television link, and receiving videos. Stanford has collected data for every single quarter over the past 25 years, and it has found some astonishing results: the students who are taught with "tutored videotape instruction" consistently *outperform* campus-based Stanford students and others learning via television.

Although low-tech, this learner-managed method is practical. Learners can hit pause during the videotape lectures if they miss a point or want to review for clarity. Hewlett-Packard students

PRINCIPLE SIX



stop the tape approximately every three to five minutes throughout the entire lecture. This is truly accessible learning — available in small increments and just-in-time.

Some teachers are changing the way they teach when they go on-line — acting more as moderators than as teachers in the old-fashioned pedagogical sense. **National Technological University** (NTU), the leading university for satellite delivery of advanced technical education, regularly broadcasts seminars to firms. To make the coursework as applicable as possible, NTU staff visit participating companies ahead of time to get a sense of how the lessons can be applied to each firm and tailor their broadcasts appropriately.

Internet-Based Training delivers individualized instruction over computer networks and is displayed by a web browser. The biggest advantage to using the Internet over computer-based technology is that it is easy to update without recalling diskettes or reprinting CD-ROMs. The information is therefore current, timely, and consistent. Courses delivered via the web require only a modem and Internet access. Because the Internet connects people in virtual communities of learners, it is expected to not only be the medium of choice in the near future, but to fundamentally change learning. However, currently limited bandwidth capabilities make it unable to handle large media files. Undaunted, the **Maricopa Community College** system in Arizona is expecting to offer an associate of arts degree entirely over the Internet in the near future. Company *Intranets* (simply the Internet deployed within the company and protected with firewalls) are significant training vehicles.

Computer learning environments can also be used to simulate the operation of actual equipment or real-life experiences. *Simulation* allows users to learn from their mistakes on-line, before they are thrown into work environments that have high risks or where cost and consequence of error is high. **Pacific Gas and Electric's Technical Learning Services**, for example, invested in simulation trailers that park right outside the power plants, allowing workers to run through the drill of shutting down a plant just before they actually do it themselves. And companies do not have to take valuable resources off-line for education and training. But because the technology is so sophisticated, simulators are exorbitantly expensive, and very few firms have made the investment.

Andersen Consulting is an exception: it spent $2 million to have Northwestern University's **Institute for the Learning Sciences** develop a 15-module, multimedia self-study program that trainees take at their respective local offices. The international firm was spending so much money on travel and lodging just to shuttle people to training, that it found the investment worthwhile. And the learn-by-doing approach of the self-study program helps Andersen trainees grasp concepts more easily. If designers of simulation technology could establish a common platform for simulation that could be marketed widely, and therefore less expensively, more companies could use this valuable training resource and refine it to their specifications.

While the consistency and convenience of technology-based training are indisputable, there are still large barriers: development time and cost. Organizations need to research their options carefully when investing in technology to ensure that it meet their needs. Not all business cultures are ready for CBT. **U.S. Robotics***, a Chicago-based manufacturing firm, has instituted a company Intranet to help workers build computer skills and the comfort level to be able to maneuver through computer programs without fear.

And technology-based options are only part of a larger education and

* U.S. Robotics merged with 3-Com on June 12, 1997

training design for most firms, colleges, and government agencies. The American Society of Training & Development's Benchmarking Forum has found that 70 percent of the time, large companies still use traditional classrooms to deliver formal training.[9] While 300 colleges and universities offer virtual degrees, the vast majority require time on campus.[10] The government has been using technology to deliver training for years, but many courses remain classroom-based.

Technology clearly has a vital role in the education and training approaches of many firms and schools across the country. One of the very real potentials of technology is not to replace classroom learning, but to address the everyday learning needs of those individuals who are not making it to classes.

Getting Schools and Teachers Up to Speed

Clearly, technology will play a greater role as large numbers of firms and schools demand learning in shorter increments. Just-in-time learning is catching on and technology can bring learning opportunities to the desktop. Business schools are beginning to get in on the action, with top schools competing to be the most technologically sophisticated. **Dartmouth College's Amos Tuck School** recently invested 20 percent of its annual budget on a technology renovation. Still, of the nation's 700 business schools, only about 35 offer M.B.A. degrees partly through remote instruction.[11]

And the greatest technological inadequacies are in the nation's secondary schools, where both up-to-date physical equipment and properly trained instructors are sorely lacking. It does little good to provide classrooms with technology if the teachers are unable to use it effectively. To best serve students, teachers themselves must sharpen their technology skills. But many teachers at the K–12 level and beyond are not being trained

how to use technology as a learning tool before they are certified to teach. While schools had 5.8 million computers (about one for every nine students) in 1995, fewer than half of the teachers regularly used computers in their instruction. Only 10 percent of new teachers in 1994 felt that they were prepared to integrate new technologies into their instruction. Fewer than half of experienced teachers had participated in professional development on the uses of new technologies.[12]


72

PRINCIPLE SEVEN

Performance measurement strengthens training by increasing accountability and transparency.

- **Sun Microsystems:** Training Profitably
- **Pacific Gas & Electric:** Performance Consulting
- **Massachusetts Career Centers:** Quality Service

In all aspects of business, there is a drive to get more for less, and the training area is no exception. Some firms have rigorous evaluations in place to ensure that every training dollar is spent effectively. Because the best training benefits the company's bottom line, the shift from simply offering training to evaluating performance improvement is one of the most important developments in the field.

But measuring performance has been challenging for many companies. It's much easier to measure the number of training hours and scores on training tests than to capture the effects of training on performance.

At **Sun Microsystems**, in Silicon Valley, training equals profits. A leader in computer network technology, Sun's product lines change every six months. That makes continuous learning opportunities absolutely critical. Yet, Sun has managed to make its training profitable. Business units within the company can get training from the corporate university, known as SunU. But if SunU falls short of what the training needs are, Sun departments can go to outside vendors. So SunU has become fiercely competitive. Its offerings are so popular and effective that SunU is now turning a profit on its training programs for Sun employees. In 1996, with a budget of $4 million for research and design of learning materials, SunU brought in $21 million in revenue. Because of its remarkable success in recovering its costs, the university will not receive any Research & Development funding up-front from Sun Microsystems in 1998.

Why Performance Measurement?

Performance measurement requires firms to evaluate how training leads to the transfer of skills, improves performance, and accomplishes specific business goals. In many firms, training is often recommended without first understanding why performance is not being achieved. A firm must be able to clearly state its business objectives and metrics for success. **Pacific Gas & Electric** (PG&E) is a model example.

A few years ago at PG&E, Technical Learning Services (TLS) embraced the concept of "performance consulting." Rather than referring workers to training without first assessing the problem, TLS sends performance consultants out into the field to get a first-hand look at work processes and to recommend appropriate interventions. It relies less on academic models of classroom learning, and prefers more practical learning opportunities at the 14 plants scattered all over the utility's 70,000 square mile territory.

The TLS program taps into the plants "best and brightest" workers to fill the performance consulting jobs. PG&E understands that for training to be effective, the consultants must understand both management and worker perspectives. Greg Thwing is one of those pulled from the rank and file to serve in management. He knows how to troubleshoot on the factory floor and is acutely aware of worker sensitivities. As a veteran dues-paying union member, he brings instant credibility to management. And he can enlist workers to develop the changes management seeks.

TLS has had tremendous success in using methods that are far less expensive than traditional classroom learning to

PRINCIPLE SEVEN

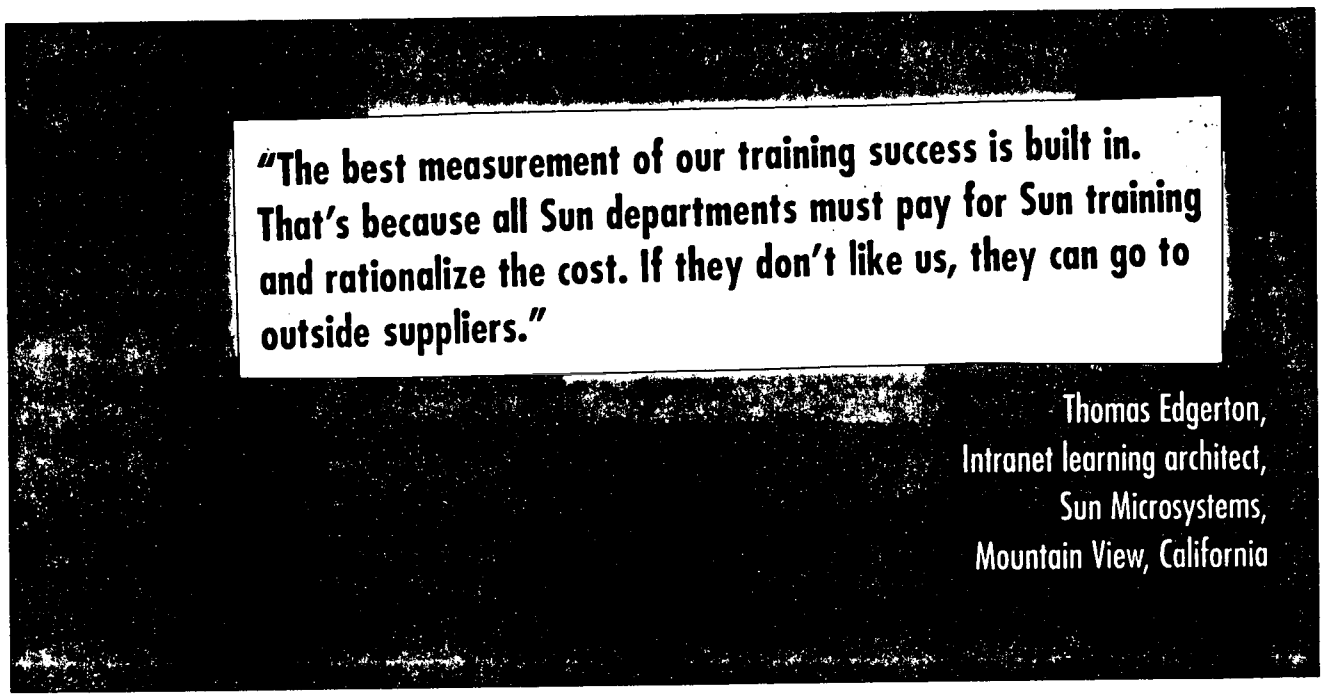
Performance measurement strengthens training by increasing accountability and transparency.

develop employee skills just-in-time and for use on the job. Like SunU, PG&E's TLS is strictly accountable. Because training budget allocations were replaced by a billable hours system, TLS has to prove its value to, and remain current with, the various business units within PG&E that buy its services. For every dollar invested in performance consulting in 1996, TLS was able to document a savings of $3.50. Not surprisingly, TLS has now become the prototype for other technical schools at PG&E and a model for other industries across the country.

Effective Measurement Tools

Research shows that learning adds immediate value to both the individual and the organization by raising wages, productivity, and/or profits. Studies show that a year of formal on-the-job training raises wages for non-college youth as much as a year of college.[13] And increased company-provided training can raise productivity of a business by 16 percent or more.[14]

But most human resource professionals are struggling with how to measure the return on investment in training and education. Although companies, schools, and governments are all under increasing pressure to demonstrate results, progress has been slow in developing effective tools that define, measure, and improve training results. Even members of the American Society for Training & Development's Benchmarking Forum — made up of large companies that invest heavily in education and training — are not likely to apply strict evaluations of training. Only 11 percent of forum member courses were evaluated in terms of skill transfer to the job in 1996. Just two percent of courses were evaluated for business impact.[15] The success of those companies that do invest heavily in workforce development may well be the most illustrative.



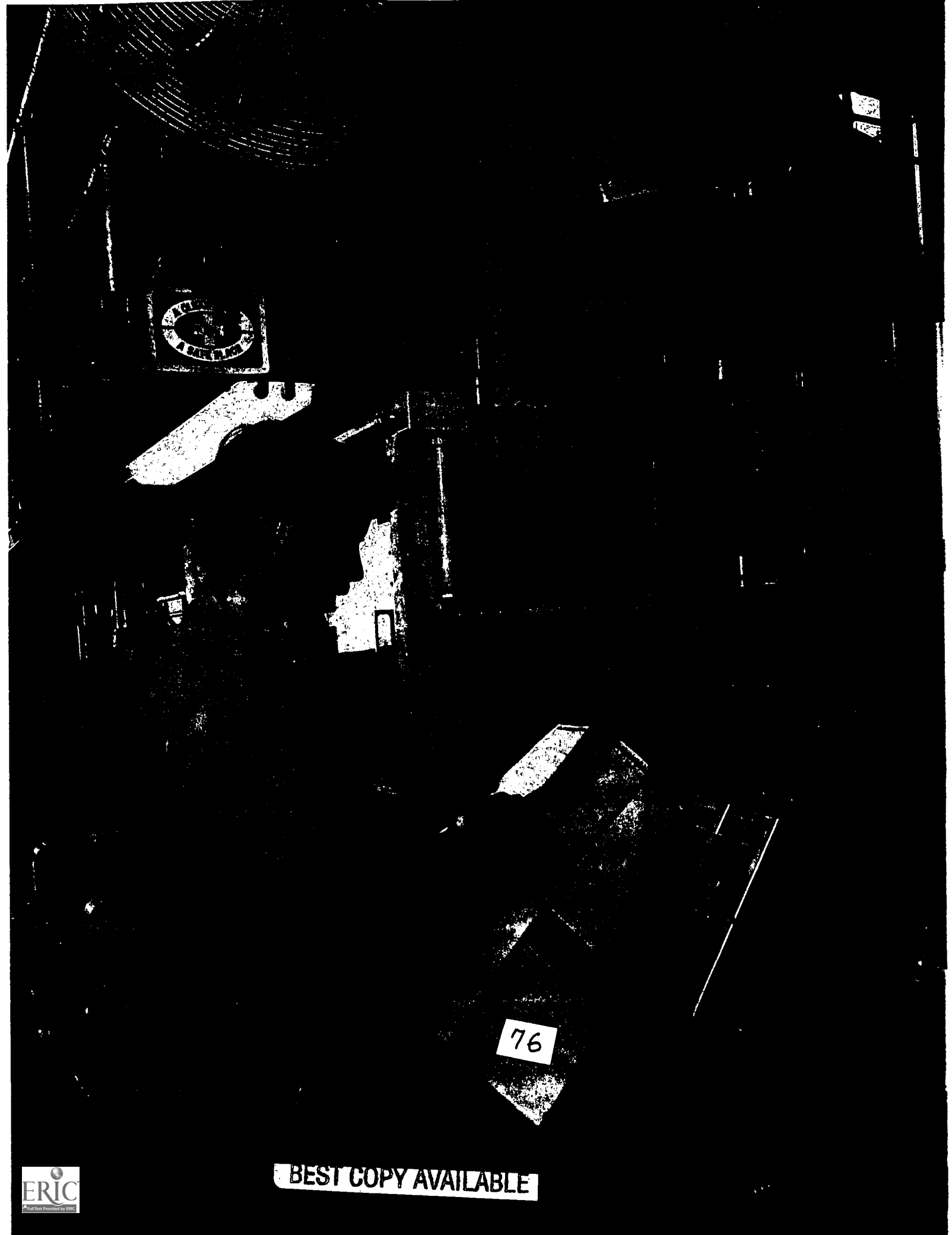
Customer-Driven

Some state-run programs are demonstrating their value by competing directly with other learning providers. **Massachusetts Career Centers**, the state's new one-stop shops for employment and training funded by a $11.6 million grant to the state from the U.S. Department of Labor,

are customer-driven, outcome-focused, and locally administered. But the state doesn't automatically operate the centers. State agencies must compete with private firms for the Career Center contracts, and the winners must then compete for clients. The system is guided by the state, but administered locally by Regional Employment Boards consisting of business, labor, education, government, and community leaders. These local boards have the power to configure the operations as they please. Instead of a state-run monopoly of one-size-fits-all centers, a variety of non-profit, for-profit and public organizations run the Career Centers at the local level.

Because Centers are commissioned for a period of no more than three years, they are held accountable for their performance and customer — that is, both employer and the job seeker — satisfaction. Centers that perform inadequately must improve quickly or go out of business.

And one-stop career centers are cost effective. By eliminating the waste and duplication of the old system, which spent well over $100 million each year to provide services throughout the state, Career Centers has successfully streamlined the system. Massachusetts estimates that the roll-out of the centers across the state will cost $60 to $70 million and will provide better quality service. Here is an obvious measure of success: a survey of 200 Massachusetts businesses revealed that 82 percent of owners or personnel managers would be likely to use a Career Center, while only 3 percent were likely to use any of the employment programs that were formerly offered by Massachusetts public agencies. The reason: the Career Centers can offer users a faster and more tailored response.



What's Ahead?

Leaders like Jodie Glore often guide organizations and provide the necessary leadership that anticipates change. One of the best ways to become distinguished as a leader is through community outreach. Whether supporting the arts center, revamping the high school math and science curricula, or instituting flexible hours to accommodate broader family needs, Glore is always looking to make **Allen-Bradley** an employee-friendly company and Milwaukee a livable city.

But a dynamic personality is not enough. All players must understand the challenges ahead and begin taking action now to ensure worker readiness.

Hungry for workers, **Ameritech Ohio** is taking practical steps to establish skills standards by working with the Cleveland Chamber of Commerce, area community colleges, and other local organizations to help train workers for entry-level jobs throughout the communications field.

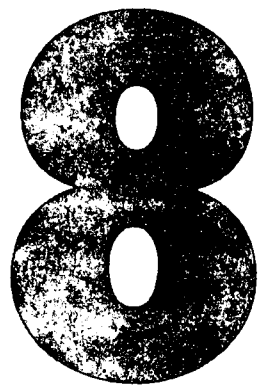
The goal of the Ameritech skills program is to organize recruitment and training processes that will create a flow of qualified workers into two occupational tracks in which workers are always in high demand: customer service representatives and communication technicians. Ameritech and other Cleveland employers with similar needs are developing skill standards, incorporating them into existing community college curricula, and offering work-based learning opportunities to spark student interest in these occupations. Participating employers are expected to hire students who successfully earn related associate degrees, meet skill standards, and pass company-specific employment tests.

Although Ameritech has driven the focus on workforce development for its own stock of employees, the company is sharing the benefits with the greater

PRINCIPLE EIGHT

The best training strategies not only meet short-term needs, but anticipate change and take early action.

- **Ameritech Ohio:** Moving Ahead in Skill Standards
- **Lucent Technologies:** Technical Skills of the Future
- **Western Governors University and Motorola:** Expanding Access and Portability
- **NYNEX, the International Brotherhood of Electrical Workers, and the Communication Workers of America:** Sending Workers Back to School

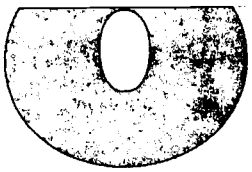


Cleveland community. In fact, some of Ameritech's direct competitors are hiring from this new pool of workers. But Ameritech knows that it has a better chance of preparing entry-level candidates by being part of a joint initiative than by going it alone. Cleveland firms are now spending less to hire more and have lower attrition rates since the student skills match industry needs. Schools are getting much needed assistance from Ameritech and other companies. And students know that if they meet the standards, they are ensured jobs in the local community. The program is easily replicable, and Ameritech plans to take it to other community colleges across the country.

Additionally, Ameritech is looking into developing a welfare-to-work training program to bring the unemployed coming off the rolls into customer service positions at Ameritech and other industries. Customer service is a major entry-level position, and many companies would benefit from an enlarged labor pool. With unemployment so low in the Midwest, Ameritech and other firms will have no choice but to help raise the skill levels of the unemployed to fill their openings.

PRINCIPLE EIGHT

The best training strategies not only meet short-term needs, but anticipate change and take early action.



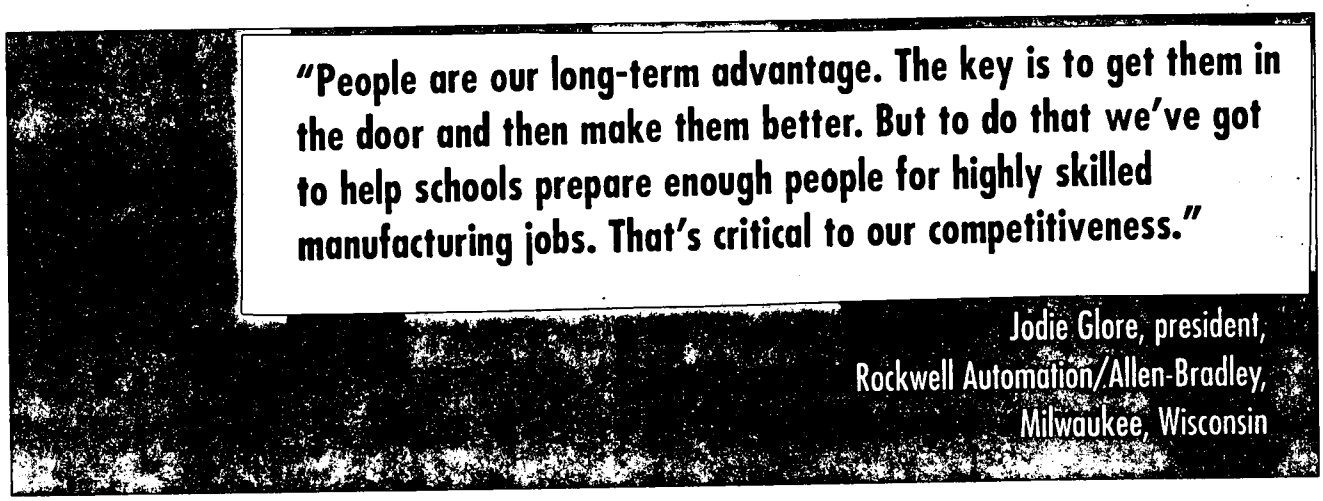
Technical Skills of the Future

Trying to build the technical skills the manufacturing industry will need five years out, **Lucent Technologies Foundation** established a manufacturing workforce collaborative. Leading the effort are a consortium of advanced technology centers at post-secondary schools across the country known as the **National Coalition of Advanced Technology Centers** (NCATC) and the **Iacocca Institute at Lehigh University**. The NCATC, a coalition that helps industry keep pace with new and emerging practices and equipment with support services and the transfer of technology, will distribute the Lucent-funded curricula nationwide to its 94 community college members in 36 states.

The technical curriculum includes a broad range of technical and workplace skills. In addition to a necessary comfort level with computers and technology, tomorrow's factory floor workers will need decision-making, teamwork, and benchmarking skills.

The program is designed to be dynamic. By using the Internet and document-sharing software, this virtual education network will make it easy to adjust courses to accommodate new requirements. This gives educators and manufacturers fast access to high quality, "off-the-shelf" courses that they can integrate into existing academic and training programs.

This means valuable economies of scale; because courses meet industry standards, manufacturers and educators will not have to invest time and resources to develop their own. Further, those who learn, regardless of whether in the classroom or via distance technology, will be able to easily transfer their skills within the industry.



Skills Development: Expanding Access and Portability

State leaders are throwing their political clout behind the revolutionary Western Governors University (WGU), which will offer a new way to deliver higher education and training. As mentioned earlier, what makes this virtual university unique is that it coordinates the needs of corporate education and individual lifelong learners by drawing from coursework that universities and corporations have already demonstrated to be effective.

In anticipation of exploding population growth in western states, the 18 governors are investing in technology rather than additional bricks and mortar to serve

the expected surge of students. Realizing that one policy maker alone could not successfully remove the barriers of regulation, bureaucracy, tradition, and turf, the governors have bonded together to pioneer this innovative concept of a virtual education. Governor Leavitt of Utah sees the change as inevitable: "We simply must align our public policies with what is occurring in the marketplace. Eventually, the inexorable forces of advanced technology will drive many of the changes contemplated in the WGU. But we can make the transition faster, and in a more organized fashion — and with less disruption to and more collaboration with traditional institutions — if all segments of society concerned with education cooperate in this development." [16]

Technology-based teaching and learning are a potentially powerful means of making educational services much more widely available. As employees take on additional training responsibilities, they are likely to demand that corporations award them with credentials certifying their skills, knowledge, and relevant experiences. To have a certificate in hand gives an employee an important credential when looking for another job opportunity inside his or her firm, or in another company where the skills are also valued.

Motorola is presently training more than 140,000 workers annually in the discipline of microelectronics/computer chip manufacturing. While the skills they are learning are highly useful and marketable in today's business environment, the workers do not receive portable credentials. So, in response to demands from their rank and file, Motorola, Intel, Micron, and other companies are looking to the WGU to develop courses for their employees, complete with assessment methodologies.

Sending Workers Back to School

The fast pace of workplace change requires that firms take a forward-looking approach to learning. Its absence will inevitably mean a loss in productivity. Companies that are left scrambling to bring existing workers up to speed and to fill available positions quickly recognize that their human resources are a key competitive advantage. Rather than discard and replace employees, some companies are taking steps to build tomorrow's workforce with today's existing payroll.

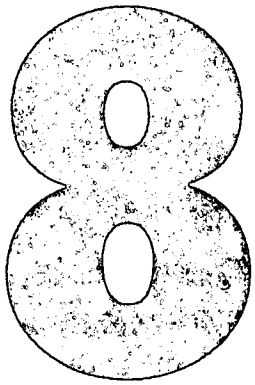
NYNEX* and its two unions, the **International Brotherhood of Electrical Workers** (IBEW) and the **Communication Workers of America** (CWA), have partnered with community colleges across New York and New England to offer union employees the opportunity to acquire an associate degree in applied science with a focus on telecommunications technology. The company wants to expand worker knowledge already accrued through in-house training and job experience and to bring a higher level of skills to an increasingly demanding marketplace.

Known as the Next Step Program, it is a four-year educational program delivered at 25 community college campuses, on company time and at company expense. Selected employees attend class one day a week and work four days a week. All the while they continue to receive a full week's pay. At the end of the training, NYNEX workers are entitled to a higher wage. Workers gain valuable technical competencies and general employability skills including teamwork, customer focus, quality, and communications skills.

Most of the colleges participating in Next Step initially lacked the capacity to provide state-of-the-art content, and the faculty were not up on the latest industry changes. NYNEX and its unions worked

* NYNEX merged with Bell-Atlantic on August 15,1997

PRINCIPLE EIGHT



closely with all faculty to focus the Next Step curriculum around relevant technical skills and knowledge, while also emphasizing customer focus, teamwork, project leadership, and critical-thinking skills. All students and faculty receive laptop computers on which they can communicate, prepare assignments, and simulate laboratory exercises, thereby creating a virtual learning environment that extends well beyond the reach of the traditional classroom.

This curriculum customization and enhancement of faculty knowledge has been accomplished through a series of faculty institutes and other developmental opportunities sponsored by NYNEX.

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4 Under Title III of the Job Training Partnership Act (JTPA), the federal government transfers money to the states to assist people who are victims of plant closings and other large layoffs. In addition to income support, JTPA Title III covers career counseling, job search assistance, and training opportunities (all of which are largely implemented by the states).

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6 Carnevale, Anthony. "Training Should Be Teamed with Smart HR Practices," *Corporate University Review,* March/April 1996. Cited in the Lotus Institute White Paper, "Distributed Learning: Approaches, Technologies and Solutions." August 1996.

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PICKING UP THE PACE

Communities across the United States are making great strides in the skills race through alliances of business leaders, workers, educators, and government agencies. Their cooperation produces striking results when the partners break out of their old roles to focus on making connections—across organizations, across town, even across the country.

The examples of success documented in this report show that while the shortfalls in workforce preparedness are national in scope, the race is won locally. Conditions are too varied and time pressures too great for a grand design drawn in Washington. But government can contribute vision and resources and create vital links among partners.

The lessons drawn from coalitions that work can and should be applied across the nation. Before any of us can become part of the solution, one has to consider: What is my individual stake? Who shares my concerns? When these questions have been answered, one can determine: What can I contribute? How can I tap into resources?

By creating learning opportunities, for example, employers can engender the loyalty and commitment of their workers and can enhance the prospects of their own business. By articulating their skill needs to educators, firms can give students an early look at career opportunities.

Schools, in turn, need to be responsive to the skill needs of employers. By establishing strong links, secondary and post-secondary institutions can not only direct their graduates to higher-paying jobs, but also equip them with a solid foundation for further skills development. If properly applied, the nation's world leadership in information technology will give educators a clear edge in preparing workers.

Workers, often led by unions, can take an active part in making their own training more effective. After evaluating their own capabilities, they can commit the time and effort to their own advancement, and look to the future with anticipation, not anxiety. Only a joint employer-employee commitment to training will work in today's environment.

Government agencies at all levels can ensure that public investments in education and training meet actual market needs. This means providing reliable information to workers and employers, tailoring programs to local conditions, and adopting performance-based funding that ensures training providers are held accountable for the quality of their services. Government is uniquely positioned to benchmark and share best practices.

What we need most are coalition builders who can bring players together. Employers and schools can make great headway by identifying self-starters and

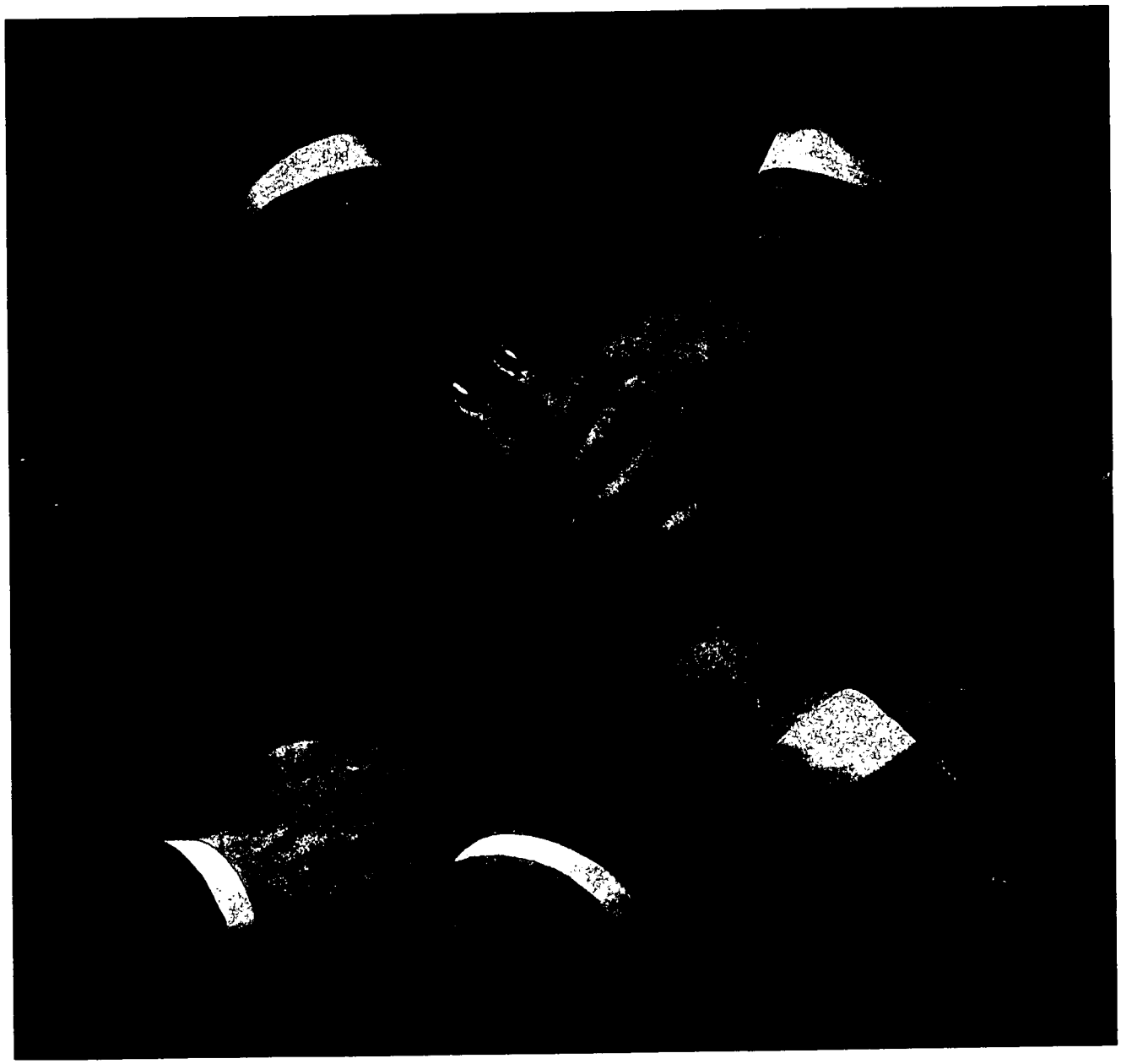
While the shortfalls in workplace preparedness are national in scope, the race is won locally.

giving them the power to lead by example. CEOs who look beyond senior management know that some of the most effective change agents may be far down the ranks or even outside the organization. Joined by leaders from companies, unions, and community colleges, government officials can send a clear message to the public that collaboration is vital.

We are at a natural point to confront the skills challenge. The economy is booming; job creation is high; unemployment is low; real wages are on the rise; and welfare rolls are shrinking. We may be in the strongest position ever to effect change. But if we miss the opportunity, demographics and global competitive pressure will work powerfully against us.

Already, we are preoccupied with keeping our aging workforce up-to-date and flexible and with training too many new entrants to learn in remedial classes what they should have mastered in school. There are high hurdles ahead. We have to pick up the pace to clear them.

What we need most are coalition builders who can bring players together.



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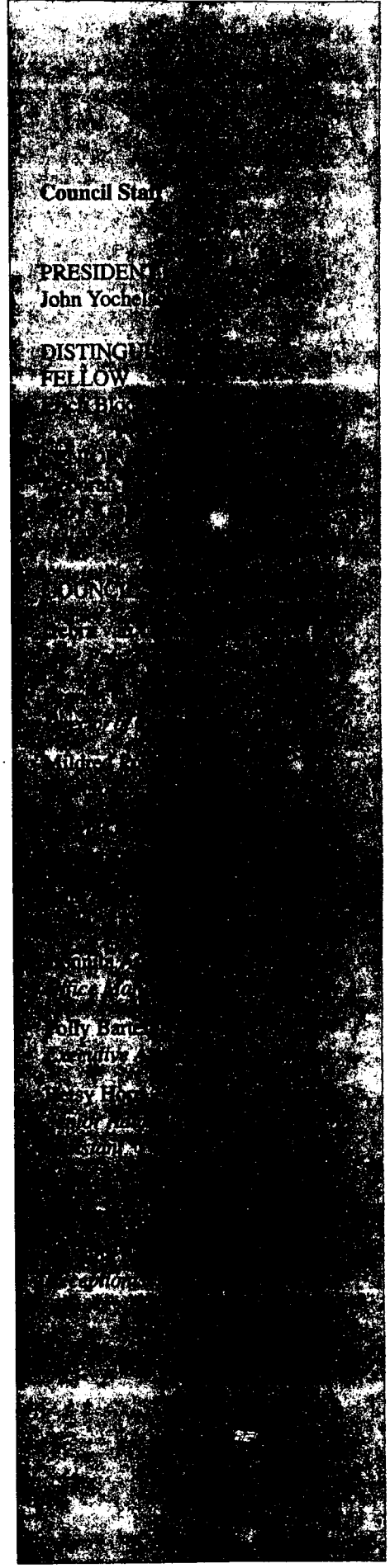

About the Council

Who We Are

The Council on Competitiveness is a nonpartisan forum of 140 corporate chief executives, university presidents, and labor leaders working together to set a national action agenda to strengthen U.S. competitiveness.

The Council defines competitiveness as our nation's capacity to produce goods and services that succeed in international markets while maintaining or boosting the real incomes of U.S. citizens.

How We Operate

The Council shapes the national debate on competitiveness by concentrating on a few critical issues. These issues include technological innovation, workforce development, and the benchmarking of U.S. economic performance against other countries.

The Council focuses on two major initiatives a year. Members and Council staff work together to assemble data, develop consensus-based recommendations and implement follow-up strategies in every region of the country. This approach allows us to combine rigorous policy analysis with the practical insights of leaders from industry, academia, and organized labor. In addition, chief executives from more than 40 of the country's most prominent nonprofit research organizations, professional societies, and trade associations contribute their expertise as national affiliates of the Council. Our work is guided by a 25-member Executive Committee. A full-time staff of 13 provides research and operational support.

Publications

1996 Competitiveness Index: *A Ten-Year Strategic Assessment*

This tenth-anniversary report assesses U.S. gains and vulnerabilities in competitiveness over the past decade. The report explores U.S. gains in recapturing global market shares, growth of per capita GDP, the reduction of both the budget and the deficit, and job creation. Top leaders in business, education and labor provide personal commentaries. October 1996 ($25)

Endless Frontier, Limited Resources: *U.S. R&D Policy for Competitiveness*

The report examines research and development trends in six key industry sectors, provides policy guidelines to meet the challenges confronting the stakeholders in America's R&D enterprise, and sets the agenda for a national discussion on the future of R&D by focusing on industry/ government/university partnerships. April 1996 ($25)

Highway to Health: *Transforming U.S. Health Care in the Information Age*

A follow-on to the Council's NII applications conference, this report illustrates how the NII can be harnessed in conjunction with market forces to address the need to control costs at a time when the demand for health care services is rising. It identifies the principle barriers preventing the development of four robust health care market segments—"Remote Care," "Individual Health Information and Management," "Integration of Health Information Systems," and "Health Care Research and Education"— and recommends steps to overcoming those barriers. March 1996 ($25)

Building on Baldrige: *American Quality for the 21st Century*

This report reviews the effectiveness of and gives recommendations for the continuation and expansion of the Malcolm Baldrige Quality Award program in promoting quality principles and practices. July 1995 ($5; copies)

Human Resources Competitiveness Profile

This report looks at a life cycle approach to competitiveness and human resource issues in four areas: family and early childhood, primary and secondary school education, university education, and training. U.S. performance in these areas is compared with other countries. April 1995 ($15)

Breaking the Barriers to the National Information Infrastructure

The third in a series of policy documents, this report highlights the Council's September 7-8, 1994, NII applications conference. It lists and examines the barriers users are facing in manufacturing, education, electronic commerce, health care, and entertainment in order to set the stage for a more constructive national policy debate. December 1994. ($25)

Critical Technologies Update 1994

An update from the Council's Gaining New Ground report, this document re-evaluates America's performance in 94 critical technologies. September 1994 ($10)

Economic Security: *The Dollar$ and Sense of U.S. Foreign Policy*

This report analyzes eight case studies involving recent foreign policy decisions, with emphasis on export controls and export sanctions, and tallies their cost to the United States in terms of lost exports and jobs. February 1994 ($25)

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The second in a series of NII policy reports, this statement offers the best thinking from a broad cross-section of the private sector on the competitive pressures driving the evolution of the U.S.-based communications industry.
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Roadmap for Results: *Trade Policy, Technology, and American Competitiveness*
This book examines the U.S. government's ability to address the trade problems of high-tech industries. It documents the failings of the current trade policy process and recommends a new approach.
June/July 1993 (Book: $40; Report: $25)

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